STATE OF MISSOURI Jeremiah W. (Jay) Nixon, Governor • Harry D. Bozoian, Director
DEPARTMENT OF NATURAL RESOURCES
dnr.mo.gov

December 8, 2016

Mr. Mark Hague
Regional Administrator
U.S. EPA, Region VII
11201 Renner Boulevard
Lenexa, KS 66219

Dear Mr. Hague:

The Missouri Department of Natural Resources' Air Pollution Control Program (air program) hereby submits the following:

Area Boundary Recommendations for the 2010 1-hour Sulfur Dioxide Standard: December 2017 Designations

Through this submittal, the air program is requesting that EPA take these enhanced recommendations into consideration during the designation process to be completed by December 31, 2017.

The state is revising its recommendation for area designations (e.g. attainment, nonattainment, unclassifiable) for the 2010 1-hour SO_2 standard. The revised recommendations are based on technical evaluations using air quality modeling to address seven parts of the State of Missouri: the areas surrounding the Ameren Meramec Energy Center, Empire District - Asbury plant, Montrose Generating Station, Sibley Generating Station, Sikeston Power Station, City Utilities of Springfield - John Twitty Energy Center, and the Thomas Hill Energy Center Power Division. The air program is enhancing the recommendations for these seven areas based on modeling analyses for these areas that demonstrates attainment with the standard. The air program is revising only the recommendation for these seven areas. For reference, the areas addressed in this revised recommendation are summarized in Table 1.

As a reminder, the air program submitted area recommendations for the 2010 1-hour SO_2 standard addressing the entire state for EPA's consideration in April 2013. These recommendations went through the state's public process and were adopted by the Missouri Air Conservation Commission on April 25, 2013. The entire table of county specific recommendations is included for reference in Table 2. For ease of reference, revisions to the April 2013 recommendation as listed in Table 1 are bolded in Table 2. The recommendation submitted in April 2013 is still relevant for all other areas not addressed in this revised recommendation.

The Missouri Air Conservation Commission adopted the revised recommendations at the December 1, 2016, commission meeting. The commission has full legal authority to develop area boundary recommendations pursuant to Section 643.050 of the Missouri Air Conservation Law. A public hearing for the proposed recommendations was held on October 27, 2016. A 30-day public comment period opened by September 26, 2016, and closed on November 3, 2016. During the public comment period, the air program received both oral and written comments from Ameren Missouri. A summary of the comments received and our responses is attached.

In order to comply with Attachment A of the "Regional Consistency for the Administrative Requirements of State Implementation Plan Submittals and the Use of 'Letter Notices'" memo dated April 6, 2011, a searchable pdf version of this document will be emailed to the EPA Regional Office. Within three business days, this complete submittal package will be posted on our website at http://dnr.mo.gov/env/apcp/naaqsboundarydesignations.htm.

Also, due to their size, paper copies of the appendices to the recommendation are not included in this package. The disk(s) included with this package contains an electronic copy of the recommendation and appendices.

Thank you for your attention to this matter. If you have any questions regarding this submittal, please contact Ms. Darcy Bybee with the Missouri Department of Natural Resources' Air Pollution Control Program at P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kyra L Moore

Kyra L. Moore
Director

KLM:akc

Enclosures:

Area Boundary Recommendation (paper copies of the appendices are not included)
Summary of comments and responses
CD with electronic copy of the recommendation and appendices

c: Missouri Air Conservation Commission
File# 2010-SO2-5-DRR Modeling

Table 1. Missouri's Revised Boundary Recommendations for the 2010 1-hour SO_2 Standard: December 2017 Designations

Affected Source	Recommended Boundary	Area Designation Recommendation
Ameren Missouri-Meramec Energy Center	Portion of St. Louis County	Attainment
Empire District Electric Co-Asbury Plant	Barton and Jasper Counties	Attainment
Kansas City Power And Light Co (KCP AND L)-Montrose Generating Station	Henry County	Attainment
KCP AND L - Greater Mo Operations-Sibley Generating Station	Portion of Jackson County	Attainment
Sikeston Power Station	Scott County	Attainment
City Utilities of Springfield - John Twitty Energy Center	Greene County	Attainment
Thomas Hill Energy Center Power Division-Thomas Hill	Randolph County	Attainment

Table 2. Missouri's Area Designation Recommendation for the 2010 1-hour SO_2 Standard (As submitted in April 2013 with revisions as listed in Table 1 in bold)

County	Recommended Classification
ADAIR	Unclassifiable
ANDREW	Unclassifiable
ATCHISON	Unclassifiable
AUDRAIN	Unclassifiable
BARRY	Unclassifiable
BATES	Unclassifiable
BARTON	**Attainment**
BENTON	Unclassifiable
BOLLINGER	Unclassifiable
BOONE	Unclassifiable
BUCHANAN	Unclassifiable
BUTLER	Unclassifiable
CALDWELL	Unclassifiable
CALLAWAY	Unclassifiable
CAMDEN	Unclassifiable
CAPE GIRARDEAU	Unclassifiable
CARROLL	Unclassifiable
CARTER	Unclassifiable
CASS	Unclassifiable
CEDAR	Unclassifiable
CHARITON	Unclassifiable
CHRISTIAN	Unclassifiable
CLARK	Unclassifiable
CLAY	Unclassifiable
CLINTON	Unclassifiable
COLE	Unclassifiable
COOPER	Unclassifiable
CRAWFORD	Unclassifiable
DADE	Unclassifiable
DALLAS	Unclassifiable
DAVIESS	Unclassifiable
DeKALB	Unclassifiable
DENT	Unclassifiable
DOUGLAS	Unclassifiable
DUNKLIN	Unclassifiable
FRANKLIN	Unclassifiable
GASCONADE	Unclassifiable
GENTRY	Unclassifiable
GREENE	**Attainment**
GRUNDY	Unclassifiable
HARRISON	Unclassifiable
HENRY	**Attainment**
HICKORY	Unclassifiable
HOLT	Unclassifiable
HOWARD	Unclassifiable
HOWELL	Unclassifiable

County	Recommended Classification
IRON	Unclassifiable
JACKSON	Nonattainment (portion of Jackson County bounded by county line on north, Kansas state border on west, Interstate-435 on the east, and the following southern boundary line that part of Jackson County north of Interstate-670 and Interstate-70 from the Kansas border to the intersection with Interstate-435)
JACKSON	**Attainment (The portion of Jackson County bounded by county lines to the North and East, Interstate 70 and 470 to the South, and Missouri Highway 291 to the West.)**
JACKSON	Unclassifiable (remaining portion of county)
JASPER	**Attainment**
JEFFERSON	Nonattainment (Herculaneum and Festus townships and the Missouri portions of Valmeyer and Selma townships west of Illinois state border)
JEFFERSON	Unclassifiable (remaining portion of county)
JOHNSON	Unclassifiable
KNOX	Unclassifiable
LACLEDE	Unclassifiable
LAFAYETTE	Unclassifiable
LAWRENCE	Unclassifiable
LEWIS	Unclassifiable
LINCOLN	Unclassifiable
LINN	Unclassifiable
LIVINGSTON	Unclassifiable
McDONALD	Unclassifiable
MACON	Unclassifiable
MADISON	Unclassifiable
MARIES	Unclassifiable
MARION	Unclassifiable
MERCER	Unclassifiable
MILLER	Unclassifiable
MISSISSIPPI	Unclassifiable
MONITEAU	Unclassifiable
MONROE	Unclassifiable
MONTGOMERY	Unclassifiable
MORGAN	Unclassifiable
NEW MADRID	Unclassifiable
NEWTON	Unclassifiable
NODAWAY	Unclassifiable
OREGON	Unclassifiable
OSAGE	Unclassifiable
OZARK	Unclassifiable
PEMISCOT	Unclassifiable
PERRY	Unclassifiable
PETTIS	Unclassifiable
PHELPS	Unclassifiable
PIKE	Unclassifiable
PLATTE	Unclassifiable
POLK	Unclassifiable

County	Recommended Classification
PULASKI	Unclassifiable
PUTNAM	Unclassifiable
RALLS	Unclassifiable
RANDOLPH	**Attainment**
RAY	Unclassifiable
REYNOLDS	Unclassifiable
RIPLEY	Unclassifiable
ST. CHARLES	Unclassifiable
ST. CLAIR	Unclassifiable
ST. FRANCOIS	Unclassifiable
STE. GENEVIEVE	Unclassifiable
ST. LOUIS	**Attainment (The portion of St. Louis County bounded by county and state lines to the South, West and East, and Interstate 255 and 50 to the North and East.)**
ST. LOUIS	Unclassifiable
ST. LOUIS CITY	Unclassifiable
SALINE	Unclassifiable
SCHUYLER	Unclassifiable
SCOTLAND	Unclassifiable
SCOTT	**Attainment**
SHANNON	Unclassifiable
SHELBY	Unclassifiable
STODDARD	Unclassifiable
STONE	Unclassifiable
SULLIVAN	Unclassifiable
TANEY	Unclassifiable
TEXAS	Unclassifiable
VERNON	Unclassifiable
WARREN	Unclassifiable
WASHINGTON	Unclassifiable
WAYNE	Unclassifiable
WEBSTER	Unclassifiable
WORTH	Unclassifiable
WRIGHT	Unclassifiable

2010 1-Hour Sulfur Dioxide Standard
–
Area Boundary Recommendations

December 2017 Designations

Prepared for the
Missouri Air Conservation Commission

Adoption

December 1, 2016

Missouri Department of Natural Resources
Division of Environmental Quality
Air Pollution Control Program
Jefferson City, Missouri

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

PURPOSE

The purpose of this document is to provide information on Missouri's recommendations for area designations for the 2010 1-hour sulfur dioxide (SO_2) standard. This document recommends attainment boundaries for seven parts of the State of Missouri: the areas surrounding the Ameren Meramec Energy Center, Empire District - Asbury plant, Montrose Generating Station, Sibley Generating Station, Sikeston Power Station, City Utilities of Springfield - John Twitty Energy Center, and the Thomas Hill Energy Center Power Division.

As allowed under the federal Data Requirements Rule (DRR) for future rounds of SO_2 designations, the state is revising its April 2013 recommendation based on refined technical evaluations for certain areas of the state. In the DRR for the 2010 SO_2 standard, EPA established a threshold for the evaluation of sources which are located in areas that were not previously designated as nonattainment. Sources that emitted more than 2,000 tons of SO_2 in the most recent emission year [2014] were evaluated. The seven main areas discussed in this document contain sources that exceed the emissions threshold and have elected to characterize the air quality surrounding their facilities through air dispersion modeling. The remaining nine Missouri sources affected by the DRR chose characterization methods other than modeling. These nine sources are also discussed in this document but the state is not revising the recommendations for these areas at this time. The final round of designations which will be based on data collected from new monitors operational by January 1, 2017, must occur by December 31, 2020. The state will have the opportunity to further revise the April 2013 recommendations with air quality monitoring data collected from 2017-2019.

The Missouri Department of Natural Resources' Air Pollution Control Program (air program) intends to submit recommendations to the EPA in December 2016, and EPA will make a final decision on designations for these areas by the court-ordered deadline of December 31, 2017. If the EPA intends to modify the state's recommendations or needs additional technical justification, they will notify the air program 120 days prior to finalizing the designations. Eighteen months after final designations, the air program will be required to submit state implementation plans (SIPs) for any nonattainment areas outlining actions that will be taken to meet the 1-hour SO_2 standard.

SUMMARY OF AREA BOUNDARY RECOMMENDATIONS

The air program is recommending attainment boundaries for each of the seven sources that chose modeling as their preferred method of characterization. The boundary for each area was selected following the five factor analysis outlined in EPA's boundary designations guidance. Each area's boundaries are based on air dispersion modeling using actual emissions data for these areas.

Table 1 summarizes the revisions to area boundary and designation recommendations for the 1-hour SO_2 standard discussed in this document and appendices. The respective appendices discuss in more detail the data and analysis used to support the recommendations. The map in Figure 1 graphically depicts these recommended area boundaries.

Table 1 – Missouri's Boundary Recommendations for the 2010 1-hour SO_2 Standard: December 2017 Designations

Affected Source	Area Boundary	Area Designation Recommendation
Ameren Missouri-Meramec Energy Center	Portion of St. Louis County	Attainment
Empire District Electric Co-Asbury Plant	Barton and Jasper Counties	Attainment
Kansas City Power And Light Co (KCP AND L)-Montrose Generating Station	Henry County	Attainment
KCP AND L - Greater Mo Operations-Sibley Generating Station	Portion of Jackson County	Attainment
Sikeston Power Station	Scott County	Attainment
City Utilities of Springfield - John Twitty Energy Center	Greene County	Attainment
Thomas Hill Energy Center Power Division-Thomas Hill	Randolph County	Attainment

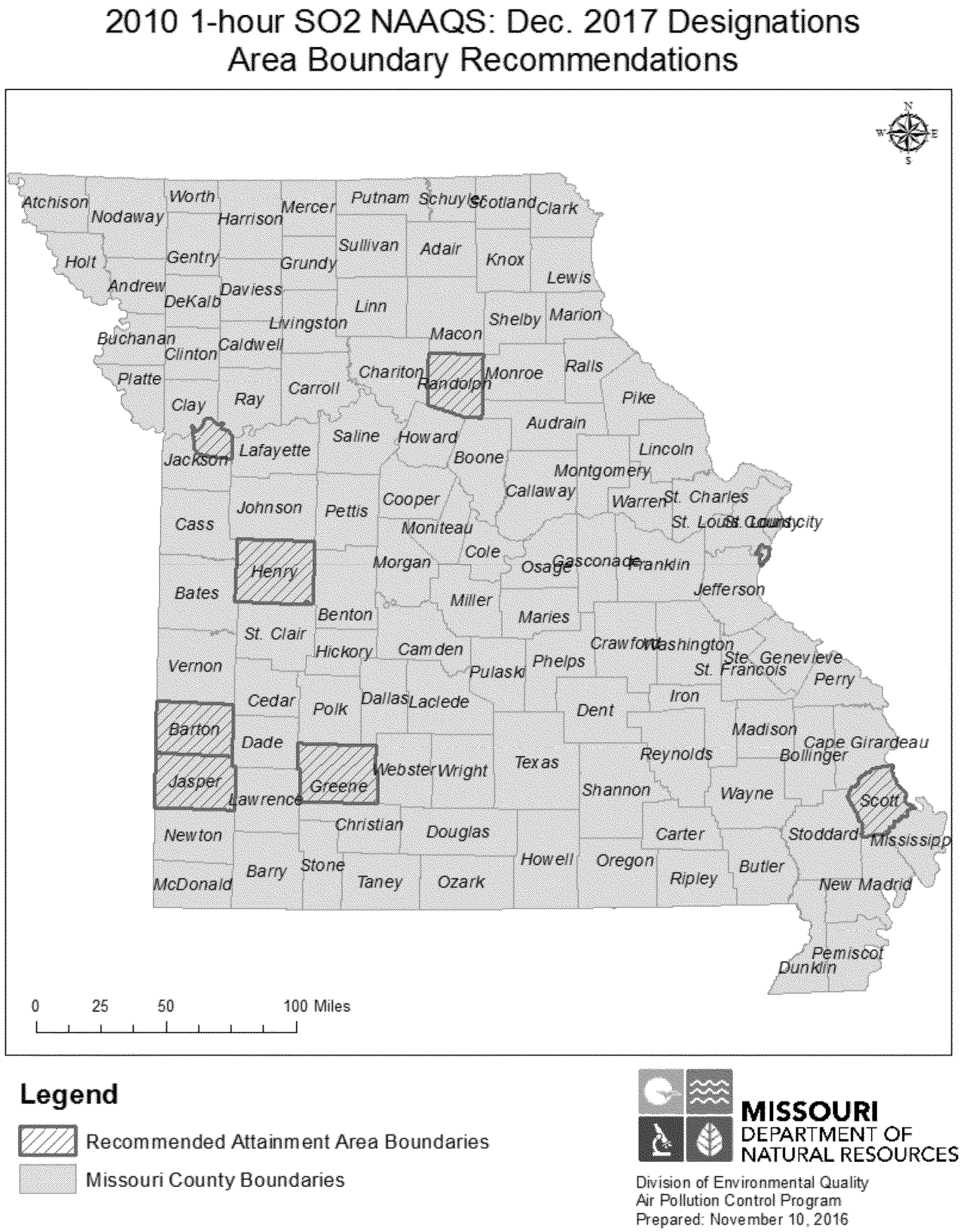

Figure 1 – 2010 1-hour SO_2 NAAQS Attainment Area Boundary Recommendations for December 2017 Round of Designations

BACKGROUND

On June 22, 2010, the EPA established a new 1-hour SO_2 primary National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb), based on the three-year average of the annual 99th percentile of 1-hour daily maximum concentrations (75 FR 35520; June 22, 2010). This new SO_2 standard replaces the previous 24-hour and annual primary SO_2 NAAQS promulgated in 1971 (36 FR 8187; April 30, 1971). Once EPA establishes or revises a NAAQS, the Clean Air Act requires EPA to designate areas as "attainment" (meeting), "nonattainment" (not meeting), or "unclassifiable" (insufficient data).

The EPA has chosen a different approach to determine attainment status for the 1-hour SO_2 NAAQS. Unlike other criteria pollutants, SO_2 is almost exclusively a point source-emitted pollutant. A monitoring network large enough to adequately cover all large sources would be prohibitively expensive and an affordable network would leave large gaps in coverage. Therefore, EPA has decided to use a hybrid monitoring-modeling approach for the implementation of the 1-hour SO_2 standard.

In the March 20, 2015 document, "Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard," EPA defines area designation categories for this standard as follows:

- Nonattainment: An area that the EPA has determined violates the 2010 SO_2 NAAQS, based on the most recent three years of ambient air quality monitoring data or an appropriate modeling analysis, or that EPA has determined contributes to a violation in a nearby area.
- Attainment: An area that the EPA has determined meets the 2010 SO_2 NAAQS and does not contribute to a violation of the NAAQS in a nearby area based on either: a) the most recent three years of ambient air quality monitoring data from a monitoring network in an area that is sufficient to be compared to the NAAQS per EPA interpretations in the Monitoring Technical Assistance Document (TAD), or b) an appropriate modeling analysis.
- Unclassifiable: An area where the EPA cannot determine based on available information whether the area is or is not meeting the 2010 SO_2 NAAQS and whether the area contributes to a violation in a nearby area.

EPA is promulgating designations under this standard for areas throughout the nation in multiple phases. In April 2013, after bringing the initial round designations through the public process and to the Missouri Air Conservation Commission (MACC), the air program submitted adopted area recommendations addressing the entire state to the EPA for consideration. In this initial round, EPA designated areas as nonattainment based on monitoring data from existing monitors showing a violation of the standard but did not act on other areas. In Missouri, EPA designated portions of Jackson and Jefferson Counties as nonattainment for the 2010 SO_2 standard, effective October 4, 2013, but did not designate any remaining areas of the state at that time.

The air program developed Nonattainment Area (NAA) State Implementation Plan (SIP) revisions for each of the nonattainment areas. The Jefferson County SIP was adopted by the

MACC on May 28, 2015 and submitted to EPA the next day. The Jackson County SIP was adopted by the MACC on August 3, 2015, and was submitted to EPA on October 9, 2015.

Subsequent rounds of designations are prescribed by a consent decree between EPA, the Sierra Club, and the Natural Resource Defense Council which was signed and entered by the court on March 2, 2015. The decree specifies a schedule for the EPA to complete SO_2 designations for the rest of the country in three additional rounds:

- Second round by July 2, 2016;
- Third round by December 31, 2017; and
- Final round by December 31, 2020.

To meet the first deadline, on June 30, 2016, EPA designated areas that contained either a newly violating monitor or a stationary source that according to the EPA's Air Markets Database:

- Emitted 16,000 tons of SO_2 in 2012; or
- Emitted 2,600 tons of SO_2 and had an average emission rate of at least 0.45 lbs. SO_2/MMBtu in 2012.

EPA designated the following areas of Missouri: portions of Jackson, St. Charles, and Franklin Counties as unclassifiable and Scott County as unclassifiable/attainment. [81 FR 45039]

The last two deadlines for EPA to complete remaining designations are December 31, 2017, and December 31, 2020. The designations completed by these later deadlines are to be made pursuant to the EPA's Data Requirements Rule (DRR) for the 1-hour SO_2 NAAQS. The final DRR was published in the Federal Register (FR) on August 21, 2015 [80 FR 51052]. The DRR establishes a timetable and other requirements for the characterization of current air quality around large sources of SO_2 emissions.

As stated in §51.1202, sources that emitted more than 2,000 tons of SO_2 in the most recent, quality assured emission year [2014], excluding sources in previously designated nonattainment areas, must be evaluated under the DRR. The DRR details two characterization options available to sources: modeling or monitoring. Alternatively, a source may elect to adopt federally enforceable emissions limitations to less than 2,000 tons per year to forego characterization under the DRR.

Specifically, the 2015 federal consent decree outlines the areas to be designated by EPA in each of the two upcoming rounds:

> *"EPA shall sign for publication in the Federal Register no later than December 31, 2017, a notice of EPA's promulgation of designations for the 2010 revised primary SO_2 NAAQS pursuant to section 107(d) of the CAA, . . . , for remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO_2 monitoring network meeting EPA specifications. . . ."*

The decree goes on to say all remaining undesignated areas must be designated by EPA no later than December 31, 2020.

In January 2016, the air program submitted a list of sources affected by the DRR around which to characterize air quality to fulfill the requirement outlined in §51.1203(a). The sources being evaluated under the DRR are listed in Table 2 and displayed graphically in Figure 2. The air program used the most recent, certified emissions year to compare to the threshold established in the DRR. At the time of developing the list for submission to EPA in January 2016, the latest certified emissions year was 2014. In June 2016, the air program submitted a document detailing the method with which each of the affected sources' air quality is to be characterized. The air program concurrently submitted a modeling protocol for characterization of air quality under the federal DRR. The air program also made the annual ambient monitoring network plan available for public inspection in May 2016. These three items together fulfill the requirement outlined in §51.1203(b).

In February and August 2016, EPA released technical assistance documents (TADs) for each avenue of characterization, monitoring and modeling, respectively. The purpose of the TADs is to aid in the technical aspects of using these methods for designation purposes. The air program relied on the TADs while developing the air quality evaluations and subsequent area recommendations presented here.

Table 2 lists the sources affected by the DRR and their chosen method of characterization as was submitted to EPA in June 2016. The sources are sorted by their 2014 actual emissions. There are 16 total sources in Missouri affected by the DRR. Four sources have elected to install new ambient air quality monitors to characterize their air quality impact. Seven areas have elected to characterize their air quality impact through air dispersion modeling using their recent actual emissions. The modeling of actual conditions acts as a surrogate for monitoring. The remaining five sources have elected to adopt federally enforceable emission limitations to forego further characterization under the DRR.

This document revises the April 2013 area boundary recommendations specifically for the seven areas containing sources that elected to characterize their air quality through air dispersion modeling. The seven sources addressed in this revised recommendation are denoted by the shaded rows in Table 2. The remainder of the April 2013 recommendation for the rest of the state is still valid for the 2010 1-hour SO_2 standard and is being re-submitted concurrently with this recommendation to EPA for reference.

Table 2 – Sources Affected by EPA's SO_2 Data Requirements Rule

Map ID	FID	Plant Name	Method of Air Quality Characterization		Federally enforceable requirement to limit SO_2 emissions to under 2,000 tpy	Description
			Monitoring	Modeling		
1	071-0003	AMEREN MISSOURI-LABADIE ENERGY CENTER	X			
2	143-0004	NEW MADRID POWER PLANT-MARSTON	X			
3	175-0001	THOMAS HILL ENERGY CENTER POWER DIVISION-THOMAS HILL		X		
4	189-0010	AMEREN MISSOURI-MERAMEC ENERGY CENTER		X		
5	083-0001	KANSAS CITY POWER AND LIGHT CO (KCP AND L)-MONTROSE GENERATING STATION		X		

ED_001261_00000549

6	201-0017	SIKESTON POWER STATION		X		
7	097-0001	EMPIRE DISTRICT ELECTRIC CO-ASBURY PLANT		X		
8	143-0008	NORANDA ALUMINUM INC-NEW MADRID	X			
9	019-0004	UNIVERSITY OF MISSOURI (MU)- COLUMBIA POWER PLANT			X	Facility-wide limit enforceable through permit
10	095-0031	KCP AND L - GREATER MO OPERATIONS-SIBLEY GENERATING STATION		X		
11	186-0001	MISSISSIPPI LIME COMPANY-STE. GENEVIEVE			X	Facility-wide limit enforceable through permit
12	077-0039	CITY UTILITIES OF SPRINGFIELD -JOHN TWITTY ENERGY CENTER		X		
13	510-0003	ANHEUSER-BUSCH INC-ST. LOUIS			X	Facility-wide limit enforceable through permit
14	127-0001	BASF CORPORATION-HANNIBAL PLANT			X	Reduction of potential to emit through equipment shutdown or fuel switch. Post-2016 PTE less than 2,000 tons per year.
15	095-0050	INDEPENDENCE POWER AND LIGHT-BLUE VALLEY STATION			X	Reduction of potential to emit through equipment shutdown or fuel switch. Post-2016 PTE less than 2,000 tons per year.
16	093-0009	DOE RUN –BUICK RESOURCE RECYCLING FACILITY	X			

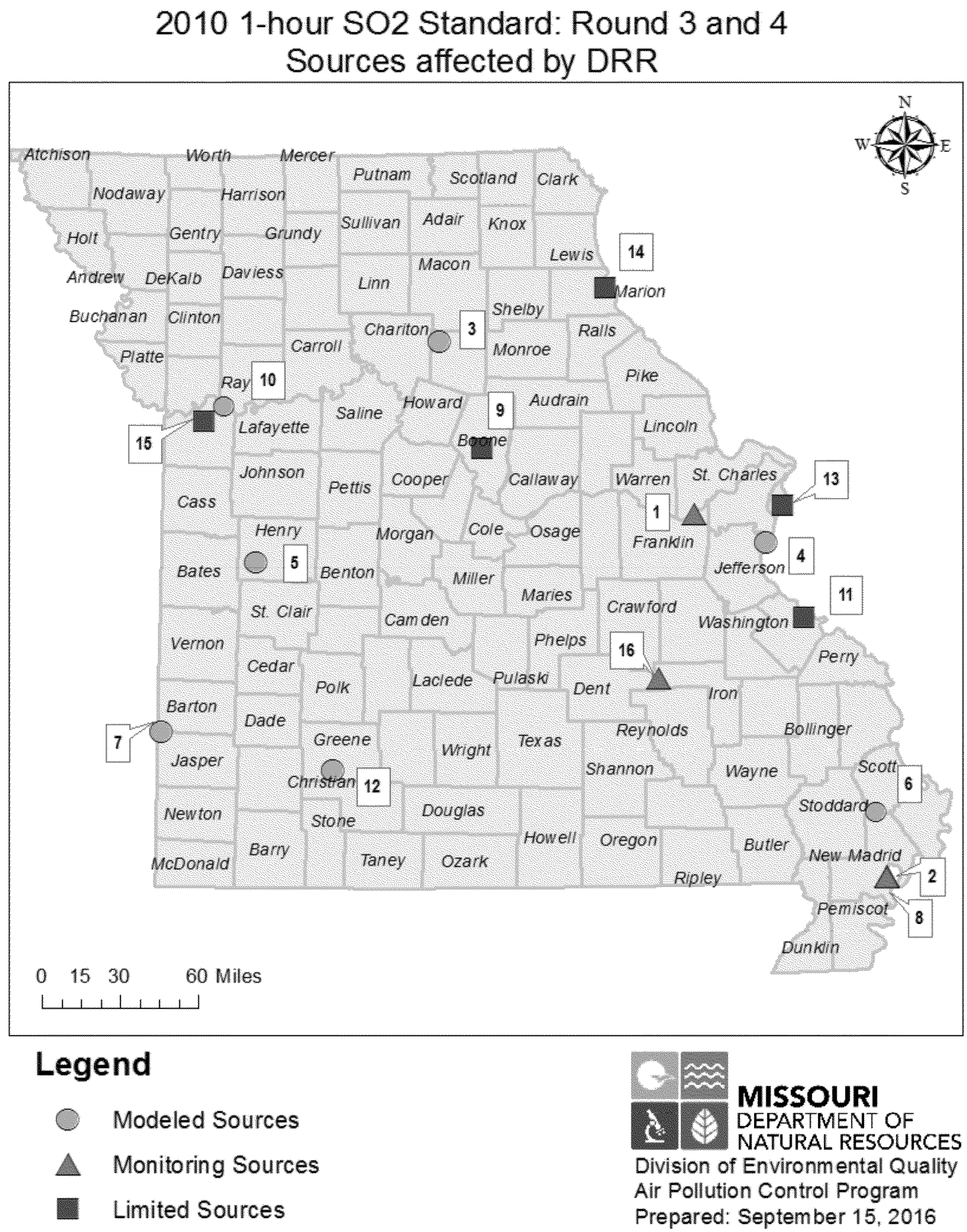

Figure 2 – Sources Affected by EPA's SO_2 Data Requirements Rule

AREAS NOT INCLUDED IN THIS REVISED RECOMMENDATION

Sources Installing New Monitors

Sources that have elected to install new ambient air monitors to characterize their air quality will not be designated in this round of designations. Designations for areas with new monitors will be based on monitoring data collected from 2017-2019. EPA is required by court order to finalize designations for these areas and all remaining undesignated areas no later than December 31, 2020. Specific information regarding the monitoring site locations can be found in the latest annual monitoring network plan available on the air program's webpage. As seen in Table 2, there are four sources that will be characterizing their air quality impact through the installation of new ambient air quality monitors: Ameren Labadie, Noranda Aluminum, AECI New Madrid, and Doe Run Buick.

Ameren Labadie began collecting monitoring data surrounding their facility in April 2015. Labadie sited two monitors surrounding their facility to quantify their air quality impact. Data collected thus far has not exceeded the standard. The two existing monitor site locations were chosen based on dispersion modeling and follow minimum monitor siting criteria. The air program is working with EPA and Ameren to ensure the monitoring network appropriately characterizes the area's air quality.

Noranda Aluminum has elected to install three monitors surrounding their facility to quantify their air quality impact. Noranda shares a property boundary with the AECI New Madrid power plant, and both are affected by the DRR. Per 51.1203(b), for any area with multiple applicable sources, the air agency (or air agencies if a multi-state area) shall use the same technique (monitoring, modeling, or emissions limitation) for all applicable sources in the area. Therefore the air program combined the evaluation of these sources and relied on a single characterization method to evaluate the combined area containing both sources due to their close proximity. Based on these evaluations, Noranda's emissions have a greater influence on the location of the area of maximum concentration than the impacts from AECI's emissions. As such, monitor site locations were chosen based on dispersion modeling with a focus on Noranda's areas of maximum concentration. All monitors follow minimum monitor siting criteria. Should Noranda not install the monitors in accordance with DRR requirements, the area including both Noranda and AECI New Madrid will be evaluated through air dispersion modeling and will be designated by EPA in December 2017 per the final 2015 federal consent decree.

Doe Run Buick has elected to site three monitors surrounding their facility to quantify their air quality impact. Monitor site locations were chosen based on dispersion modeling and follow minimum monitor siting criteria.

Sources taking a 2,000 ton per year limit

Sources that have elected to limit their emissions to less than 2,000 tons of SO_2 per year may forgo the requirement for further characterization under the DRR. EPA has indicated that taking a satisfactory limit removes the source from undergoing the DRR's required technical evaluation at this time. These and any remaining undesignated areas that have not installed and begun operation of a new SO_2 monitoring network will be designated in December 2017. As mentioned previously, the April 2013 recommendations for these areas and the rest of the state are still valid and are not being revised at this time. The sources taking new limits are listed below along with a brief description of the limit's enforceable mechanism.

The University of Missouri Power Plant has elected to take a facility-wide 2,000 ton per 12 month rolling average SO_2 limit in a construction permit. Construction Permit #112016-004 contains specific limit related language. This permit is available on the air program's issued permit webpage.

Mississippi Lime Company has elected to take a facility-wide 2,000 ton per 12 month rolling average SO_2 limit in its Title V operating permit. Mississippi Lime Company's Title V Permit #OP2013-035A (Amendment Project #2016-03-080) contains specific limit related language. This permit is available on the air program's issued permit webpage.

Anheuser Busch has elected to take a facility-wide 2,000 ton per 12 month rolling average SO_2 limit in its Title V operating permit. Anheuser Busch's Title V Permit #OP2016-041 contains specific limit related language. This permit is available on the air program's issued permit webpage.

Sources with new potential emissions below 2,000 tons per year

The BASF-Hannibal plant has removed their coal burning/handling capabilities to comply with other federal regulations. Their potential emissions are now below 2,000 tons of SO_2 per year. This is enforceable through construction permit #072013-001. Specifically, BASF dismantled two coal burning boilers in 2015 to comply with the federal Major Source Boiler MACT (Maximum Achievable Control Technology) regulation. Since the coal boilers were removed, there are four incinerators at BASF that account for the majority of their current potential SO_2 emissions. Their current facility-wide calculated potential emissions sum to 1,963.3 tons of SO_2 per year. BASF's reported actual emissions from 2015, excluding the two coal boilers that have since been removed, do not exceed 200 tons. BASF is therefore no longer subject to further characterization under the DRR. Further source discussion and potential emission calculations are included in Appendix I for reference.

As of January 2016, Blue Valley has switched to burning exclusively natural gas to comply with other federal regulations. Their potential emissions are now below 2,000 tons of SO_2 per year. This is enforceable through 10 CSR 10-6.261. The compliance date for this rule is January 1, 2017. Blue Valley is therefore no longer subject to further characterization under the DRR. Specifically, Blue Valley discontinued burning coal and switched to exclusively burn natural gas in all of its three boilers to comply with the Major Source Boiler MACT and the MATS (Mercury Air Toxics Standard). Boilers 1 and 2 are subject to the Boiler MACT and boiler 3 is subject to the MATS. The compliance dates were April 16, 2015, for the MATS and January 31, 2016, for the Boiler MACT.

Table 3 – Summary of Sources Electing DRR Compliance Methods other than Monitoring or Modeling

Source Name	Compliance Method	Enforceable Mechanism
Anheuser Busch	Facility-wide 2,000 tpy limit	Title V Permit #OP2016-041
BASF-Hannibal	PTE less than 2,000 tpy	Construction Permit #072013-001

Blue Valley	PTE less than 2,000 tpy	10 CSR 10-6.261
Mississippi Lime Company	Facility-wide 2,000 tpy limit	Title V Permit #OP2013-035A
University of Missouri Power Plant	Facility-wide 2,000 tpy limit	Construction Permit #112016-004

RECOMMENDATION FOR 1-HOUR SO_2: ATTAINMENT

The area boundaries and designation recommendations presented in this document were developed in accordance with EPA's March 20, 2015, document titled, "Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard." This guidance provides information on the recommended process for designating areas under the 2010 revised 1-hour SO_2 NAAQS. In this document, EPA lists five factors to be considered when developing boundary designation recommendations:

- Monitoring/Modeling data
- Emissions information, including growth, controls, and regional emission reductions
- Meteorology
- Topography
- Jurisdictional boundaries

The air program developed the enclosed 1-hour SO_2 boundary recommendations based on these five factors. Appendices A.1 through G.1 detail the technical analysis performed for each of the seven modeled areas. Table 4 lists the respective appendix for each source. Each area analysis evaluates the five factors as they apply to the individual area and details the rationale for the recommendation. The modeling protocol details the general modeling conditions and procedures utilized in these technical evaluations. The protocol is included in Appendix H.

The supporting modeling files for each area are included for reference in the second subpart (A.2, B.2, etc.) of each sources' appendices. Certain lengthy modeling files are excerpted, but the complete set of all modeling files used for these analyses are available upon request in digital format from the air program. As established in EPA's modeling TAD, modeling for designation purposes should be done using actual emissions to act as a surrogate for monitoring data. Hourly emissions, recorded by Continuous Emissions Monitoring Systems (CEMS), are the best option for source characterization. Additional justification is given for sources without hourly recorded emissions. Moreover, EPA has indicated that hourly variable stack release parameters should be used in modeling for designation purposes when available.

Table 4 – Source Appendices

Affected Source	Appendix
Ameren Missouri-Meramec Energy Center	A
Empire District Electric Co-Asbury Plant	B
Kansas City Power And Light Co (KCP AND L)-Montrose Generating Station	C
KCP AND L - Greater Mo Operations-Sibley Generating Station	D
Sikeston Power Station	E
City Utilities of Springfield - John Twitty Energy Center	F
Thomas Hill Energy Center Power Division-Thomas Hill	G

COMMENTS AND RESPONSES ON

AREA BOUNDARY RECOMMENDATIONS FOR THE 2010 1-HOUR SULFUR DIOXIDE STANDARD: DECEMBER 2017 DESIGNATIONS

The public comment period for the proposed area boundary recommendations for the 2010 1-hour sulfur dioxide (SO_2) standard: December 2017 designations opened on September 26, 2016 and closed on November 3, 2016.

The following is a summary of comments received and the Missouri Department of Natural Resources' Air Pollution Control Program's (air program's) corresponding responses. All comments were related to the area around the Ameren Meramec Energy Center; no comments were received on the areas surrounding the Empire District - Asbury plant, Montrose Generating Station, Sibley Generating Station, Sikeston Power Station, City Utilities of Springfield - John Twitty Energy Center, and the Thomas Hill Energy Center Power Division. The air program finalized the state's area boundary recommendation based on consideration of the comments received.

SUMMARY OF COMMENT(S): During the public comment period for the proposed area boundary recommendations, the air program received oral testimony and written comments from Ameren Missouri.

COMMENT #1: Ameren Missouri provided oral testimony in support of the air program's proposed recommendation of attainment for the area containing the Ameren Meramec Energy Center. Ameren also commented that they are committed to clean, reliable, affordable energy while continuing to comply with environmental regulations. Ameren commented that they prefer the use of actual monitoring data for area designations and that modeling is conservative in nature; nonetheless the modeling for Meramec Energy Center demonstrates compliance with the standard and supports an attainment area designation.

RESPONSE: The air program appreciates Ameren's comment and support of its proposed attainment area recommendation for the Meramec Energy Center. No changes were made to the document as a result of these comments.

Ameren Missouri also provided written comments specific to the dispersion modeling performed to support the attainment area recommendation for the area around the Meramec Energy Center.

COMMENT #2: Ameren asserts that the area around Meramec Energy Center should have been classified as rural and modeled with rural dispersive conditions rather than the urban dispersive conditions used by the air program in its modeling evaluation.

RESPONSE: AERMOD, EPA's recommended dispersion model per Appendix W, contains an option to model a source under either rural or urban dispersive conditions. Air program staff evaluated the entire model domain, a 20 x 20 kilometer grid centered on Meramec Energy Center, to determine the most representative classification for the entire area, urban or rural. In Section A.1 of Appendix A to the recommendation, the air program references EPA guidance documents that detail land use and population as the primary elements to consider when characterizing an area as urban or rural. The air program evaluated land use categories and population density for the entire modeling domain around Meramec Energy Center. Since the full modeling domain includes the urbanized area of south St. Louis and urban heat islands are known to extend beyond the boundary of the urban core, the air program chose urban dispersive conditions as representative for the modeling domain containing the Meramec Energy Center.

Ameren submitted an additional modeling analysis that relied on rural dispersive conditions. Ameren's analysis resulted in lower modeled concentrations than the air program's modeled results. The air program acknowledges these differences and notes that the use of either the rural or urban option will result in an attainment area recommendation. The air program appreciates receiving Ameren's perspective and further supporting analysis. No changes were made to the document as a result of these comments.

COMMENT #3: Ameren states that the regional background concentration for urban areas used by the air program in the modeling is not representative of the area around Meramec Energy Center but the air program should have instead incorporated the regional background concentration for rural areas.

RESPONSE: The AERMOD model allows the user to incorporate a regional background concentration in the model result to account for natural, unknown, and not explicitly modeled sources of pollution. For the same reasons as described in the response to Comment #2, when determining to treat the entire modeled area as urban, the air program elected to use the regional background concentration for urban areas of 13 ppb that has been used in previous SO_2 modeling exercises. The approach used to establish these regional background concentrations, for both urban and rural values, has since been deemed acceptable and representative by EPA[1]. The use of the higher urban background concentration adds another conservative layer to the evaluation to ensure that no violations of the standard are likely to occur. The air program appreciates Ameren's perspective that the highest modeled impacts occur when winds originate from the south, or otherwise not flowing through the urban core of St. Louis. No changes were made to the document as a result of these comments.

[1] See EPA's Response to Comments on Area Designations for the Second Round under the 2010 1-hour SO_2 standard, page 110.

STATE OF NEBRASKA

Pete Ricketts
Governor

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DEC 6 2016

Mark J. Hague
Regional Administrator
US EPA Region 7
11201 Renner Blvd.
Lenexa, KS 66219

RE: Addendum to the Nebraska 2016 Ambient Air Monitoring Network Plan
A proposal for an additional SO_2 monitoring site to meet Part 51 Subpart BB requirements

Dear Mr. Hague:

Enclosed is the *Addendum to the Nebraska 2016 Ambient Air Monitoring Network (2016 NP Addendum)*. This document is submitted pursuant to the requirements set forth in 40 CFR Part 58.10 and Part 51 Subpart BB (a.k.a. as the data Requirements Rule or DRR).

The *Nebraska 2016 Ambient Air Monitoring Network* (2016 NP) was made available to the public on the NDEQ web site on or before May 16, 2016. The public comment period ended June 17, 2016. One set of comments was received from the Omaha Public Power District (OPPD). Those comments were addressed. The 2016 NP and comment response documentation was submitted to the EPA Region 7 Administrator on June 29, 2016.

EPA R7 in reviewing the 2016 NP advised that a different SO_2 monitoring site was needed to fulfill the Part 51 Subpart BB requirements. The 2016 NP Addendum is the proposal to establish this site. The 2016 NP Addendum was put on the NDEQ web site for public inspection and comment for seven days ending November 30, 2016 as directed by EPA R7. No comments were received. The only changes made between the public inspection draft and the final were footer designations differentiating the public inspection draft from the final. The final 2016 NP Addendum is attached.

Please direct questions or inquiries concerning the *2016 NP* Addendum to to Carrie Wiese at 402/471-6624 or carrie.wiese@nebraska.gov.

Sincerely,

Kevin Stoner
Administrator
Air Quality Division

Enclosures:
Addendum to the Nebraska 2016 Ambient Air Monitoring Network Plan

ecopies w enclosures:
Gregory Crable & Leland Grooms, US EPA Region 7
Russ Haden, DCHD
Jim Fobben & Chris Schroeder, LLCHD

NEBRASKA
DEPT. OF ENVIRONMENTAL QUALITY

Addendum to the 2016 Ambient Air Monitoring Network Plan

NDEQ Document # 16-020a

Date: November 17, 2016

Purpose: This addendum proposes to establish a new, source-oriented, ambient air monitoring site for SO2 at the OPPD ballpark on Pershing Drive in Omaha, NE.

Background: The Nebraska Department of Environmental Quality (NDEQ), in consultation with EPA Region 7, submitted on June 29, 2016, a proposal in the 2016 Ambient Air Monitoring Network Plan (Attachment F), to use the existing SO_2 site at 1616 Whitmore Street in Omaha, NE to meet the monitoring requirements of 40 CFR Part 51 Subpart BB (a.k.a. the Data Requirements Rule or DRR). Upon further review and consultation with EPA Region 7, the NDEQ now proposes to establish a new monitoring site to meet the DRR monitoring requirements. This new site is to be operational by 1/1/2017.

The existing SO_2 monitoring site at 1616 Whitmore will be retained, as proposed in the 2016 Ambient Air Monitoring Network Plan.

DRR Justification:
Emission Sources

The main major SO_2 emission sources in the vicinity of North Omaha Station are the Station itself, Eppley Airfield in Omaha, and Mid-American's Walter Scott Energy Center in Council Bluffs, IA. North Omaha Station has historically been a coal-fired electrical generating unit (EGU), and is capable of generating approximately 650 megawatts of electricity.

Based on annual Acid Rain Program data over the past 10 years, North Omaha Station's total SO_2 emissions (for Units 1 through 5) have ranged from approximately 10,500 tpy to 15,000 tpy with the average being approximately 13,000 tpy. For 2015, the total SO_2 emissions for all units were 13,892 tons. Figure Ad-1 shows these data, demonstrating an overall downward trend in SO_2 emissions.

Quarterly Acid Rain Program data from the past 10 years indicate that, in general with few exceptions, the highest SO_2 emissions from the facility occur during the 3rd quarter and sometimes 4th quarter. This is to be expected during the hottest months of the year due to increased demand on power stations for cooling needs. Figure Ad-2 demonstrates these trends.

In 2014, the OPPD board of directors approved a plan to retire three of the five coal-burning units at North Omaha Station, and to install emissions controls on the remaining two units which will be refueled in 2023 with natural gas. OPPD ceased coal operation of the first three coal-burning units in April 2016 (these units are still capable of firing natural gas); these three units accounted for approximately 47% of the facility's annual SO_2 emissions, on average, while burning coal.

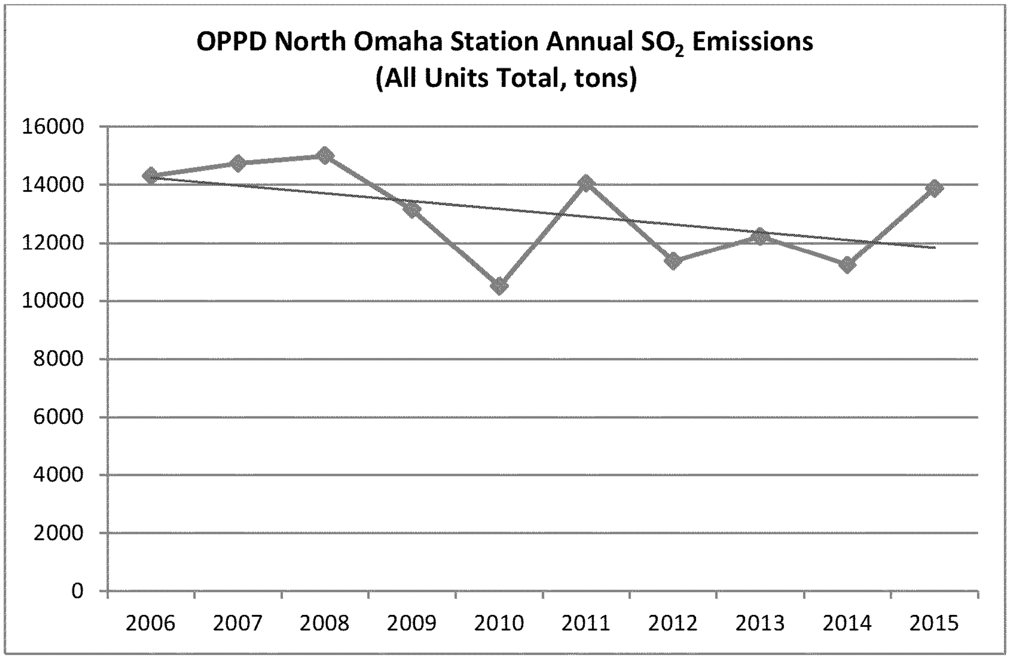

Figure Ad-1: OPPD North Omaha Station Annual SO_2 Emissions

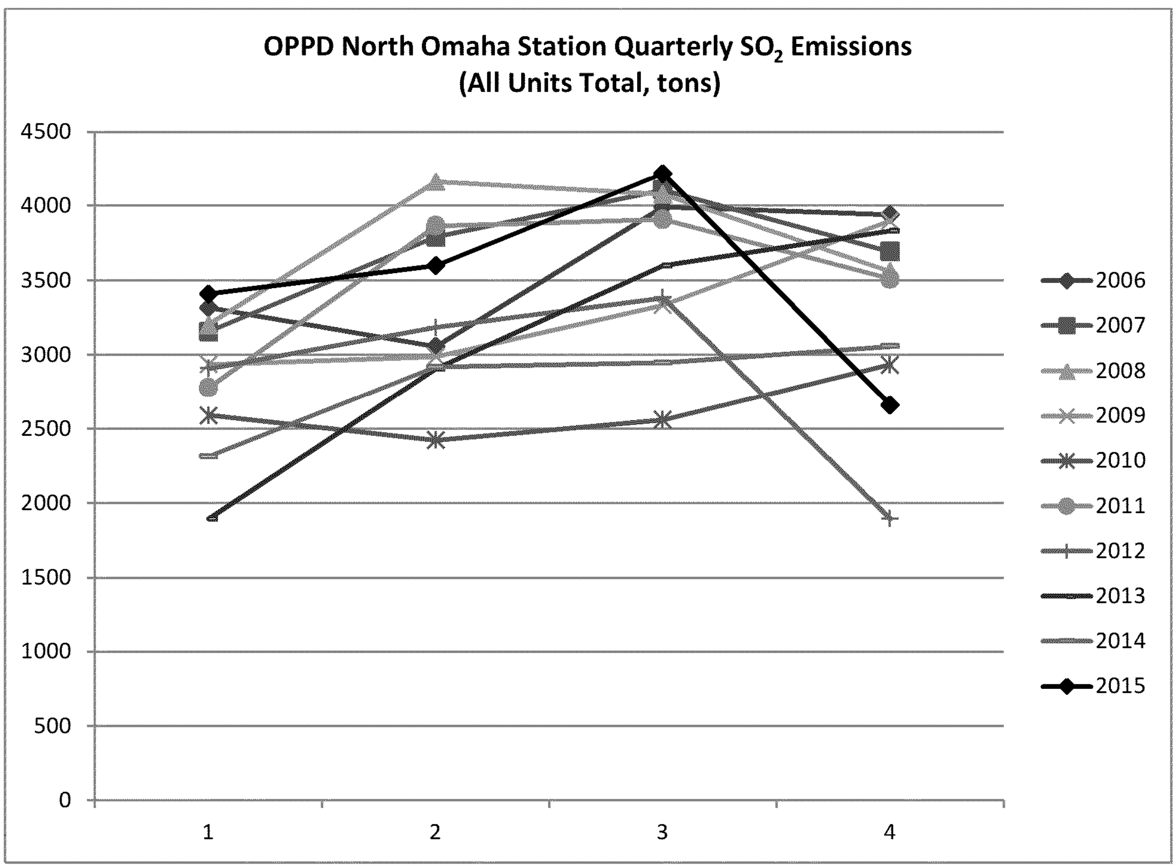

Figure Ad-2: OPPD North Omaha Station Quarterly SO_2 Emissions

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Existing Air Quality Data
Due to existing SO_2 monitors in the Omaha area, including the Whitmore monitor, data are available to characterize air quality with respect to SO_2 for an extended period of time. As demonstrated in Figure Ad-3, excerpted from NDEQ's *2015 Ambient Air Monitoring Network Plan & Assessment*, there is a significant overall downward trend in maximum annual average SO_2 in the Omaha MSA since measurement collection began, and also a significant decline in the range of maximum annual values in more recent years.

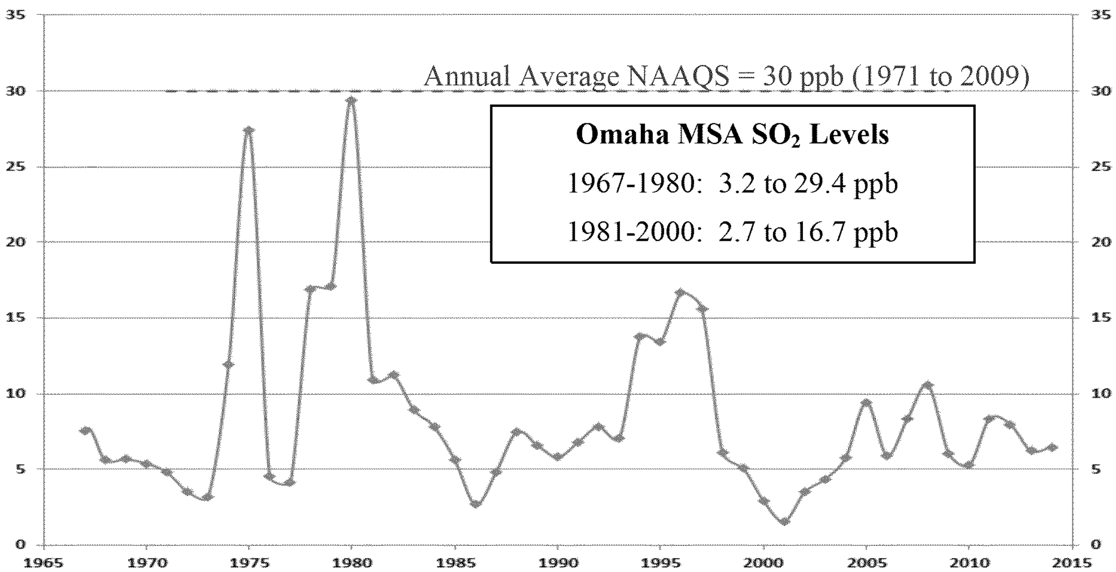

Figure Ad-3: Maximum Annual Average SO2 in Omaha MSA: 1967-2014

As demonstrated in Figure Ad-4, the Whitmore monitor has recorded an overall downward trend in annual 99th percentile SO_2 values since 2006, as well as declines in the three-year design values. No design values have exceeded the 2010 1-hour SO_2 NAAQS since 2009.

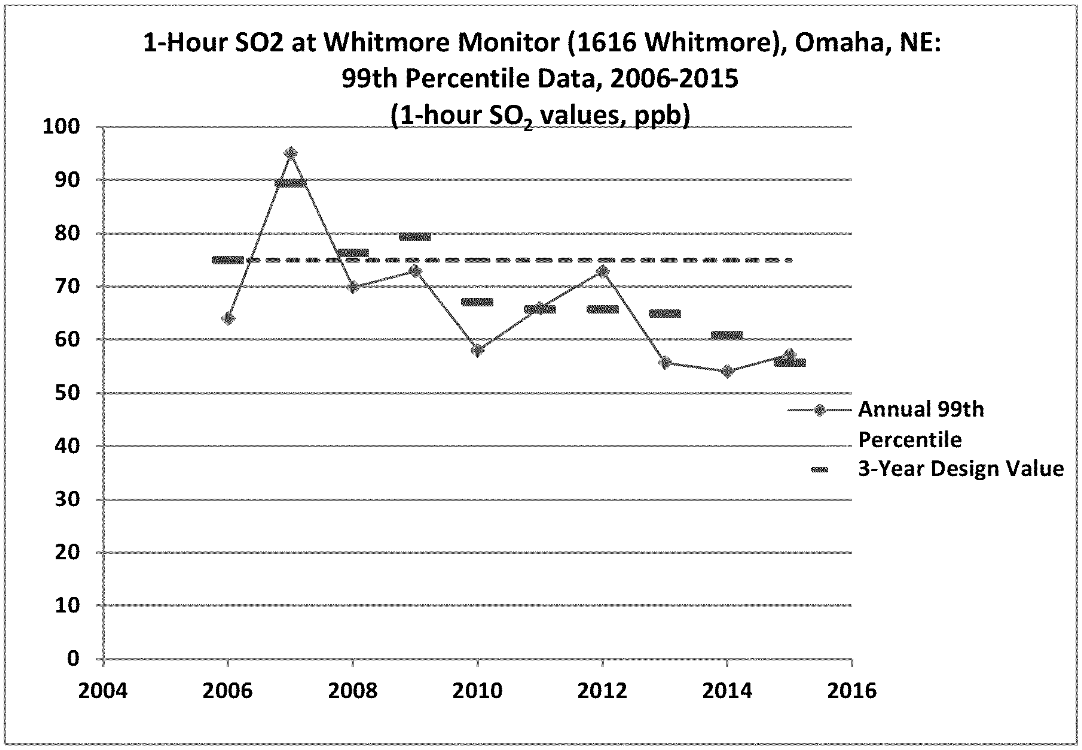

Figure Ad-4: 99th Percentile and Design Values of 1-hour SO_2 at Whitmore Monitor, 2006-2015

Modeling and Studies

A 1997 University of Nebraska master's thesis (*Examination of SO_2 Ambient Air Monitoring Location Using Air Dispersion Modeling* by Eitan Tsabari) examined SO_2 concentrations in the north Omaha area and the use of an air dispersion model to appropriately identify monitoring locations. The study identified the highest 1-hour SO_2 concentrations to the southeast of North Omaha Station, and modeled SO_2 concentrations (while consistently higher than measured concentrations) also fell within this area.

NDEQ conducted AERMOD modeling in June 2016 in support of considering monitor placement for North Omaha Station for DRR purposes. This more recent modeling indicates the highest average 1-hour SO_2 concentrations fall to the southeast and west of North Omaha Station, as indicated in Figure Ad-5.

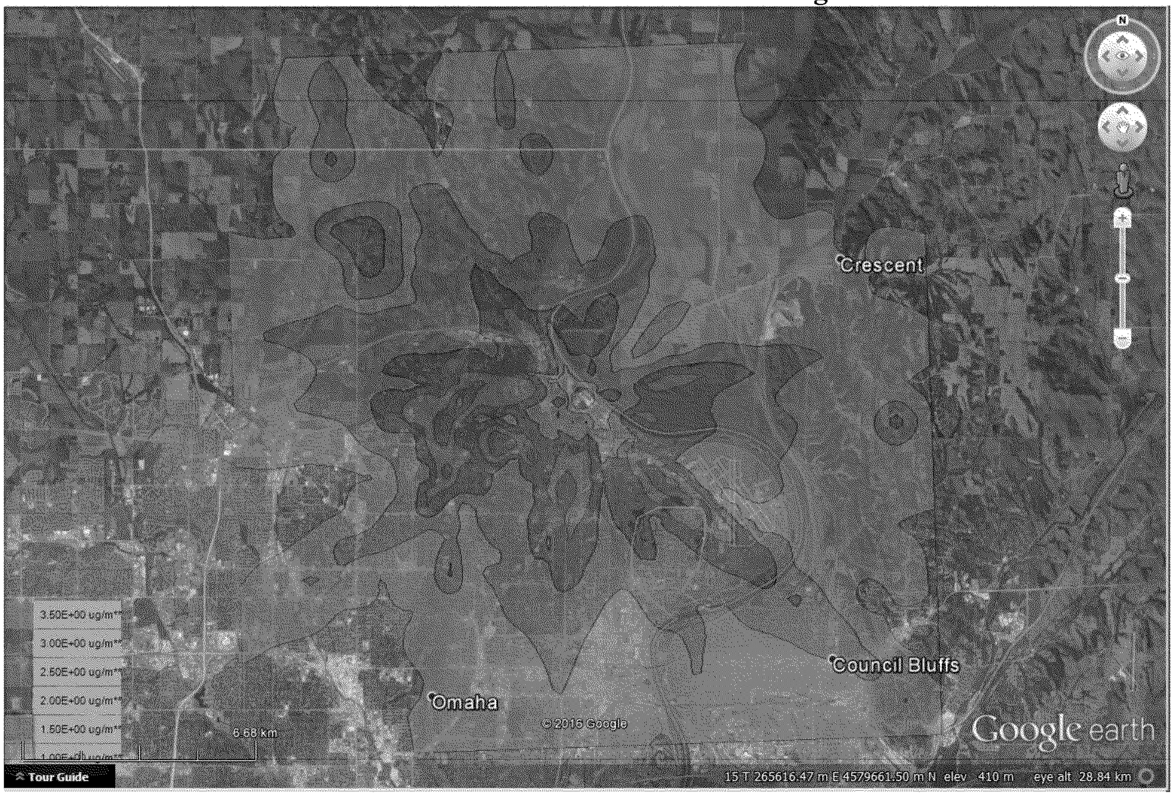

Figure Ad-5: NDEQ-modeled First-high Average 1-hour SO_2 Concentrations, 2016

Following original submission of the network monitoring plan to EPA on June 29, 2016, NDEQ and the Iowa Department of Natural Resources (IDNR) were contacted by EPA and requested to consider impacts from the Walter Scott Energy Center (approx. 19 km southeast) on North Omaha Station and vice versa, in part to consider whether the two sources should use the same data characterization method per the DRR, being in the same “area”. IDNR produced modeling that demonstrated the impacts of emissions from North Omaha Station were not reciprocal to impacts from the Walter Scott Energy Center on North Omaha Station, and that attainment around the Walter Scott Energy Center would best be characterized through modeling, while attainment surrounding North Omaha Station could effectively be characterized through monitoring. EPA also requested additional modeling from NDEQ to further analyze the impacts of the Walter Scott Energy Center around North Omaha Station for purposes of monitor placement, and produce a ranking analysis that follows the recommended approach from the EPA 1-hr SO2 Monitoring Technical Assistance Document (TAD) and is similar to that found in the Georgia Department of Natural Resources 2016 Ambient Air Monitoring Plan. The dispersion modeling, which used 3 years (2012-2014) of normalized emissions data from North Omaha and Walter Scott was conducted in cooperation with EPA Region 7 staff, through approved protocols.

The MAXDAILY output file produced by AERMOD was analyzed using Excel spreadsheet formulae to determine, for each modeled day of meteorology, the receptor with the maximum 1-hour SO2 concentration on that day and is combined with the 4^{th} highest maximum 1-hr SO2 modeled concentration to produce a receptor score. From this, the top 100 receptors were ranked (Table Ad-1 and Figure Ad-6), with the lowest scores representing the top ranked receptors.

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
253661.1 4580764.4	4	3.60068	65	164	229
250911.1 4578514.4	6	3.01916	47	182	229
253090.9 4579683.8	1	7.90919	174	54	228
247911.1 4581014.4	2	5.43359	116	110	226
252411.1 4578764.4	2	5.5969	116	106	222
253661.1 4578264.4	1	8.44074	174	46	220
252911.1 4580264.4	5	3.55149	53	167	220
251911.1 4580264.4	1	8.61063	174	45	219
251661.1 4581764.4	1	8.63094	174	44	218
249911.1 4584014.4	1	8.6461	174	43	217
251911.1 4578014.4	4	3.92929	65	150	215
254161.1 4580014.4	3	4.96206	89	125	214
251661.1 4578764.4	1	9.04993	174	36	210
253056 4580098.5	3	5.08667	89	121	210
253778 4579345.2	2	6.01046	116	93	209
251911.1 4577764.4	3	5.1654	89	119	208
250911.1 4586264.4	2	6.12349	116	90	206
250661.1 4582514.4	1	9.27907	174	31	205
250911.1 4583764.4	1	9.29149	174	30	204
252161.1 4578264.4	1	9.57256	174	28	202
253072.1 4579782	2	6.23888	116	85	201
253649.8 4579068.3	2	6.26343	116	84	200
249411.1 4582764.4	1	9.7304	174	25	199
253911.1 4578514.4	5	4.3059	53	146	199
248161.1 4580514.4	2	6.42779	116	81	197
253411.1 4578264.4	2	6.48141	116	80	196

Addendum to the 2016 Ambient Air Monitoring Network Plan

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
252161.1 4577764.4	2	6.52924	116	79	195
253745.4 4579494.9	3	5.63415	89	105	194
252661.1 4579764.4	2	6.66788	116	74	190
248411.1 4582014.4	1	10.67337	174	15	189
253670.1 4579560.7	2	6.72931	116	71	187
253661.1 4579014.4	2	6.82083	116	69	185
253081.5 4579732.9	2	6.92502	116	67	183
253161.1 4578514.4	7	4.40795	37	143	180
253181.1 4579988.9	3	6.18878	89	87	176
253911.1 4578764.4	10	3.85841	22	154	176
253444.4 4579758.4	2	8.17908	116	49	165
253100.2 4579634.7	2	8.35747	116	48	164
248661.1 4582014.4	3	6.65851	89	75	164
249911.1 4585764.4	2	8.37373	116	47	163
253911.1 4580014.4	7	5.0618	37	124	161
250161.1 4579264.4	2	8.92528	116	40	156
252911.1 4579514.4	2	8.93183	116	39	155
251161.1 4578514.4	3	7.1286	89	66	155
250161.1 4585014.4	2	9.00141	116	37	153
252661.1 4579014.4	3	7.20133	89	64	153
253557.3 4579659.5	3	7.55158	89	61	150
253661.1 4580014.4	6	5.67643	47	103	150
253411.1 4580514.4	4	6.28314	65	83	148
253411.1 4578514.4	3	7.82657	89	56	145
253661.1 4580514.4	6	5.84887	47	98	145
250161.1 4583014.4	2	9.67187	116	26	142

Addendum to the 2016 Ambient Air Monitoring Network Plan

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
253594.9 4579626.6	4	6.63399	65	76	141
250411.1 4581764.4	2	9.85925	116	24	140
253911.1 4580264.4	7	5.74945	37	100	137
253248.1 4579237	4	6.79289	65	70	135
253692.4 4579094.4	7	5.85256	37	97	134
253109.6 4579585.5	3	8.65345	89	42	131
253283.4 4579201.5	4	7.14351	65	65	130
252411.1 4579514.4	4	7.93854	65	53	118
252911.1 4579014.4	5	7.30569	53	63	116
253119 4579536.4	4	8.14088	65	50	115
253353.8 4579130.6	5	7.71737	53	58	111
252911.1 4579264.4	5	7.90059	53	55	108
250411.1 4582014.4	3	10.74439	89	14	103
249911.1 4583014.4	4	9.10055	65	33	98
253256.3 4579923.1	7	8.04318	37	52	89
253389.1 4579095.1	4	9.94604	65	20	85
253411.1 4580014.4	5	9.15268	53	32	85
251411.1 4581764.4	4	10.4599	65	17	82
253218.7 4579956	10	7.55485	22	60	82
253161.1 4580264.4	16	6.68595	8	72	80
251411.1 4580264.4	4	10.9018	65	13	78
253607.2 4579042.2	7	8.78206	37	41	78
251661.1 4582014.4	4	11.57316	65	11	76
253409.2 4579074.8	4	11.61527	65	10	75
253632.5 4579593.7	6	9.64629	47	27	74
253430.4	4	13.01129	65	6	71

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
4579071.8					
253406.8 4579791.3	6	10.45729	47	18	65
253161.1 4580514.4	20	7.55502	5	59	64
253411.1 4579014.4	5	11.80037	53	9	62
251911.1 4580514.4	5	11.94383	53	8	61
253661.1 4580264.4	24	7.73063	3	57	60
253411.1 4578764.4	7	9.92953	37	21	58
253519.7 4579692.5	10	9.07595	22	34	56
253661.1 4578514.4	11	8.97698	18	38	56
253411.1 4580264.4	37	8.11045	1	51	52
253661.1 4578764.4	17	9.06968	7	35	42
253294 4579890.1	10	10.13393	22	19	41
252661.1 4579514.4	11	9.90786	18	22	40
253161.1 4578764.4	15	9.4022	10	29	39
253494.8 4578973.3	8	13.9279	33	3	36
253431.9 4579071.6	9	13.20433	29	5	34
253485 4578988.7	9	14.03447	29	2	31
253161.1 4579014.4	16	9.86968	8	23	31
253564.5 4579016	10	12.36971	22	7	29
253331.6 4579857.2	15	10.669	10	16	26
253458 4579030.8	10	14.25943	22	1	23
253369.2 4579824.2	21	11.51426	4	12	16
253521.9 4578989.9	19	13.32461	6	4	10

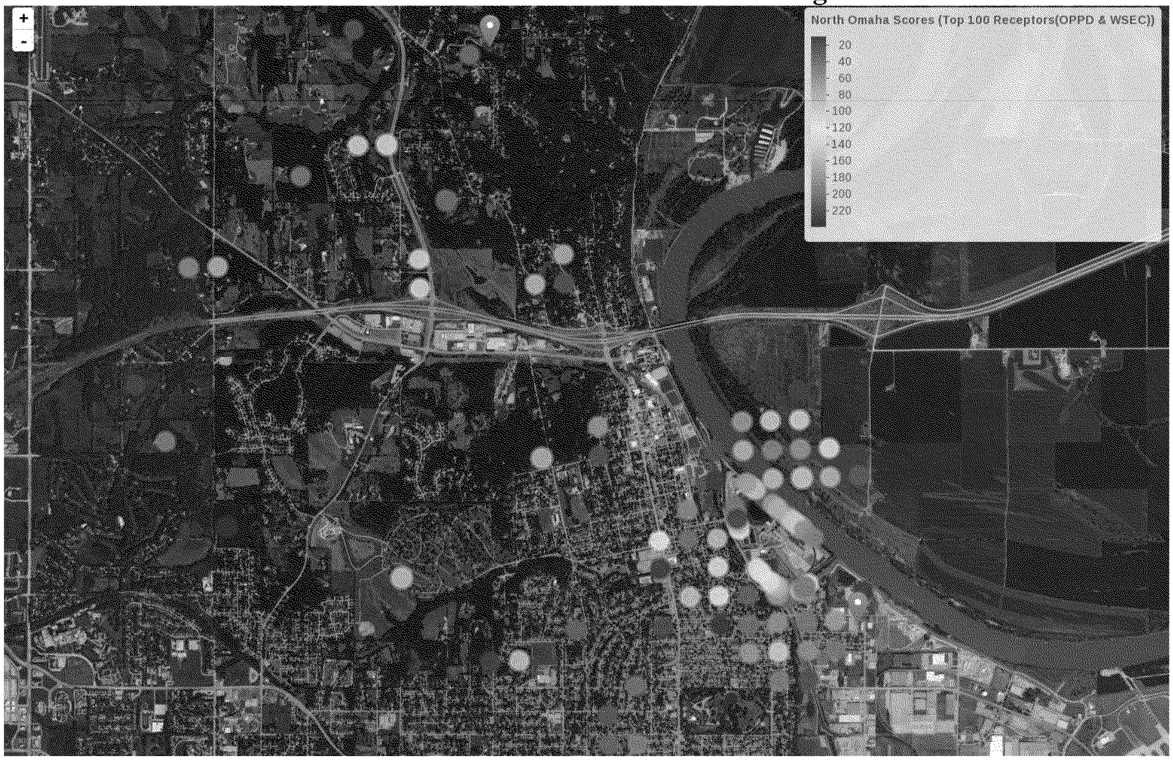

Figure Ad-6: Top 100 Receptor Locations Surrounding North Omaha Station. The lowest total scores (red dots) represent the top ranked receptor locations.

As Figure Ad-6 demonstrates, the cluster of highest-ranked receptors not in the Missouri River or along its banks (and therefore in danger of flooding) appear south of North Omaha Station. The proposed monitoring location is in this area.

Meteorological Data

As shown in Figure Ad-7, wind roses from the nearest meteorological stations (OMA and CBF) indicate general prevalent wind direction in the area as NW/NNW or S/SSE.

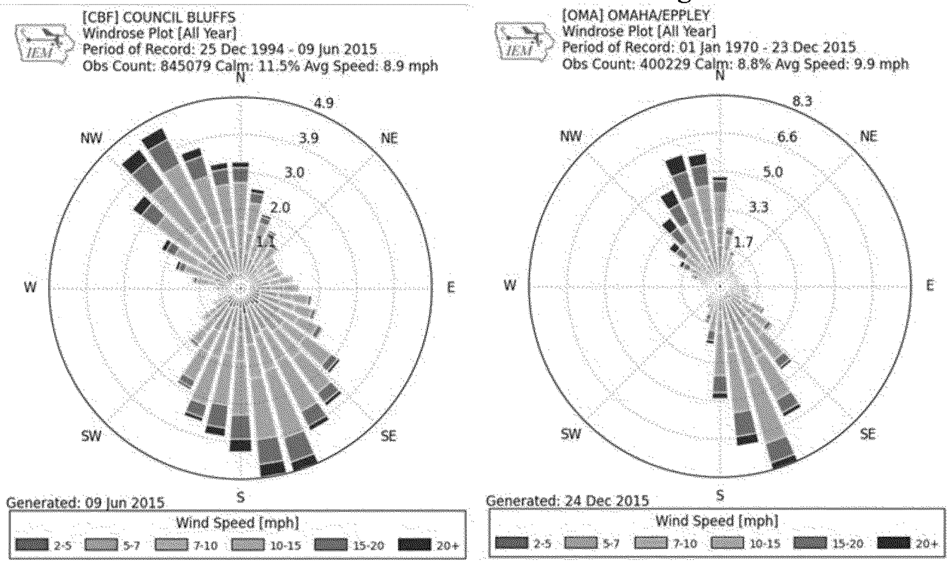

Figure Ad-7: Omaha Area Wind Roses

Geographic Influences

As indicated in Figure Ad-6, much of the area south of OPPD's North Omaha Station consists of metropolitan development, while much of the area north and west of North Omaha Station is wooded or farmland. It should be noted that an SO_2 monitor was previously placed in the wooded area north of North Omaha Station, but was decommissioned in 2010 due to consistently low recordings; it is likely that this monitor was impacted by tree canopy.

Site Determination

Through the additional modeling conducted by NDEQ and EPA Region 7 staff, NDEQ was able to narrow down a proposed site location. Installation of a monitor in or along the Missouri River would be infeasible, as would installation of a monitor within residential neighborhoods or in wooded areas. The remaining most feasible location is in the vicinity of the ballfields/parking area immediately south of the power plant, along John J. Pershing Drive. This is the proposed monitoring location (Figure Ad-8).

Figure Ad-8: Proposed DRR Monitoring Location for North Omaha Station

EPA Region 7 staff visited the site on November 9, 2016 and confirmed there were no concerns with the location in terms of interference from the roadway or rail line, and that it was appropriately placed to monitor the most feasible area of highest impact as indicated by the cluster of receptors as shown in Figure Ad-6.

The proposed site is fairly level with no trees or other major concerns for placement of the monitor and supporting equipment. Figure Ad-9 provides photos of the proposed site and its surroundings.

Figure Ad-9: Photos of Proposed DRR Monitoring Location for North Omaha Station

1. From proposed site, looking north toward North Omaha Station

2. From proposed site, looking east

Figure Ad-9 (cont'd): Photos of Proposed DRR Monitoring Location for North Omaha Station

3. From proposed site, looking south toward John J. Pershing Drive

4. From proposed site, looking west

Because the existing Whitmore monitoring site was placed specifically to capture SO_2 readings from North Omaha Station in an economically disadvantaged area for environmental justice purposes, the NDEQ feels that Whitmore and this single additional proposed monitoring location will satisfy DRR needs. Further, given the expected drastic reduction and possible near-elimination of SO_2 emissions from this facility (given halted operation with coal of Units 1-3 and impending conversion of Units 4 and 5 to natural gas in the coming years), NDEQ feels that additional investment in installing monitors for this source would be an unwise expenditure of limited funding and resources.

NDEQ will provide a trailer to house the monitor and supporting equipment, while the Douglas County Health Department will provide the monitor and supporting equipment. OPPD will provide electricity and fencing around the trailer. Douglas County Health Department will operate the monitor.

Proposed SO_2 Monitoring Site: Additional Information and Part 58 Compliance Review

The proposed SO_2 monitoring location is to be a micro-scale, source-oriented site with respect to OPPD's North Omaha Station, a coal-fired electrical generating unit in Omaha, NE. The site is on the south end of the North Omaha Station property and adjacent to a public parking area associated with ball fields at that location. The approximate Lat/Long coordinates are 41° 19' 32" N and 95° 56' 46" W. The site is ~40 m east of Pershing Drive and 15 m north of a rail car parking area. The location of the proposed site is shown in Figure Ad-8. Also see photos of site location in Figure Ad-9.

The proposed site will meet applicable requirements of 40 CFR Part 58. A compliance review with respect to Part 58 Appendixes A thru E is provided below.

Appendix A - QA Requirements for Monitors used for NAAQS Evaluations: The Douglas County Health Department (DCHD) will operate the site. DCHD has experience operating SO_2 sites and meeting Appendix A QA requirements. Operating, maintenance and QA requirements will comply with the requirements of the *Quality Assurance Project Plan (QAPP)for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation and Total Reduced Sulfur* (EPA approved 11/24/14).

Appendix B - QA Requirements for PSD Monitors: Not applicable. This will not be a PSD air monitoring site.

Appendix C – Ambient Air Quality Monitoring Methodology: The proposed site will utilize a continuous FEM SO_2 analyzer capable of taking 1-minute SO_2 readings.

Other equipment will include a data logger or computer capable of storing the 1-minute analyzer data; and two sets of calibration equipment (i.e., a calibrator, a zero air system and EPA-protocol SO_2 calibration gas). One set is for annual calibration and biweekly zero/span/precision checks and the other is for audits.

The make and model of the FEM analyzer, calibrator and zero air system have not been finalized. The FEM analyzer will be either purchased as a new unit or be no more than 5 years old. The calibrator and zero air system used will meet the specifications required for the FEM analyzer. All equipment will meet 40 CFR Part 58 Appendix C requirements.

Analytical equipment will be housed in a temperature-controlled enclosure that maintains interior temperatures between 20° to 30° C.

Appendix D – Network Design Criteria: Modeling was performed to identify the highest concentration area for the site. The proposed location meets the criteria for a microscale site as set forth in Appendix E Section 4.4.

Appendix E - Probe and Monitoring Path Siting Criteria: The preliminary site review sheet (below) demonstrates that the site will meet Appendix E requirements.

Nebraska NAMS/SLAMS Siting Criteria Review Sheet for Sulfur Dioxide		
Pre-Siting Review for proposed SO_2 site at NPPD's Sheldon Station Agency: Nebraska Department of Environmental Quality : Location: 7475 Pershing Drive, Omaha, NE Approximately 425 m SSE of the main entrance to the OPPD Nor th Omaha Station main entrance and ~ 40 m east of Pershing Drive Approximate Lat/Long 41° 19' 32" N and 95° 56' 46" W AIRS Site ID: Proposed site - To be assigned (31-055-nnnn) Date: November 10, 2016 Reviewer: Jim Yeggy		
Monitoring Objective: Source-oriented		Scale: Micro-scale
40 CFR Part 58 Appendix E Criteria	**Requirements**	**Review Comments**
Section 2: Horizontal & vertical probe placement	2 to 15 m above ground	Analyzer will be housed within an enclosed trailer or dedicated enclosure structure. Inlet will be constructed to comply with inlet placement criteria . Anticipated inlet height ~3 m.
	At least 1 m from supporting structure	
	If on side of building, should be on side of prevailing winter wind	Not applicable.
Section 3: Spacing from minor sources	No furnace or other minor SO_2 sources nearby	OK. There is a railcar parking area ~ 15 m south of the site, but the locomotive engines used to park the cars maintain a distance of 1500 feet from the monitoring site.
Section 4: Spacing from obstructions	Distance from obstacle to probe at least 2x the obstacle height above the probe	OK. The North Omaha Station stacks range are 204 feet high , and are located 400 to 480 m north of the monitoring site. There are no obstructions between the stacks and the monitoring site.
	Exceptions for street canyon or building mounted inlets	Not applicable
Section 5: Spacing from trees	At least 10 m from tree drip - line	OK. The drip line of the closest tree is ~ 35 m WNW of the proposed site.
	Microscale sites: no trees between source and probe	OK. The re are no trees between the stacks and proposed site . The closest tree is located 35 m WNW of the site , while the stacks are directly north.
Section 6: Spacing from Roadways	Not applicable to SO_2	Not applicable
General Comments: None		

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Addendum to the 2016 Ambient Air Monitoring Network Plan
NDEQ Document # 16-020a

Date: November 17, 2016

Purpose: This addendum proposes to establish a new, source-oriented, ambient air monitoring site for SO2 at the OPPD ballpark on Pershing Drive in Omaha, NE.

Background: The Nebraska Department of Environmental Quality (NDEQ), in consultation with EPA Region 7, submitted on June 29, 2016, a proposal in the 2016 Ambient Air Monitoring Network Plan (Attachment F), to use the existing SO_2 site at 1616 Whitmore Street in Omaha, NE to meet the monitoring requirements of 40 CFR Part 51 Subpart BB (a.k.a. the Data Requirements Rule or DRR). Upon further review and consultation with EPA Region 7, the NDEQ now proposes to establish a new monitoring site to meet the DRR monitoring requirements. This new site is to be operational by 1/1/2017.

The existing SO_2 monitoring site at 1616 Whitmore will be retained, as proposed in the 2016 Ambient Air Monitoring Network Plan.

DRR Justification:
Emission Sources

The main major SO_2 emission sources in the vicinity of North Omaha Station are the Station itself, Eppley Airfield in Omaha, and Mid-American's Walter Scott Energy Center in Council Bluffs, IA. North Omaha Station has historically been a coal-fired electrical generating unit (EGU), and is capable of generating approximately 650 megawatts of electricity.

Based on annual Acid Rain Program data over the past 10 years, North Omaha Station's total SO_2 emissions (for Units 1 through 5) have ranged from approximately 10,500 tpy to 15,000 tpy with the average being approximately 13,000 tpy. For 2015, the total SO_2 emissions for all units were 13,892 tons. Figure Ad-1 shows these data, demonstrating an overall downward trend in SO_2 emissions.

Quarterly Acid Rain Program data from the past 10 years indicate that, in general with few exceptions, the highest SO_2 emissions from the facility occur during the 3rd quarter and sometimes 4th quarter. This is to be expected during the hottest months of the year due to increased demand on power stations for cooling needs. Figure Ad-2 demonstrates these trends.

In 2014, the OPPD board of directors approved a plan to retire three of the five coal-burning units at North Omaha Station, and to install emissions controls on the remaining two units which will be refueled in 2023 with natural gas. OPPD ceased coal operation of the first three coal-burning units in April 2016 (these units are still capable of firing natural gas); these three units accounted for approximately 47% of the facility's annual SO_2 emissions, on average, while burning coal.

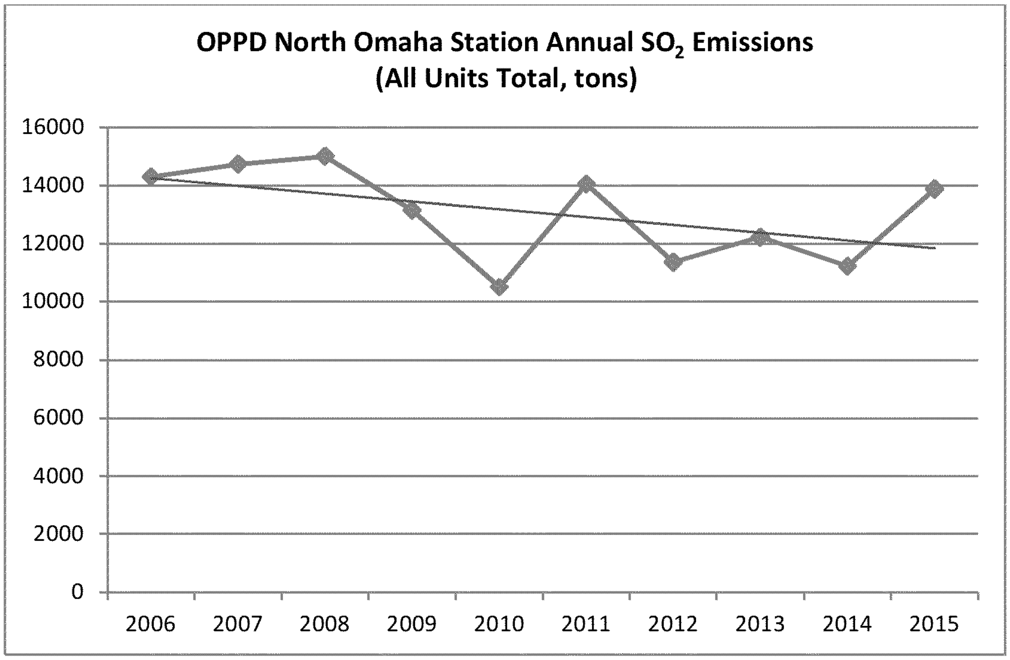

Figure Ad-1: OPPD North Omaha Station Annual SO_2 Emissions

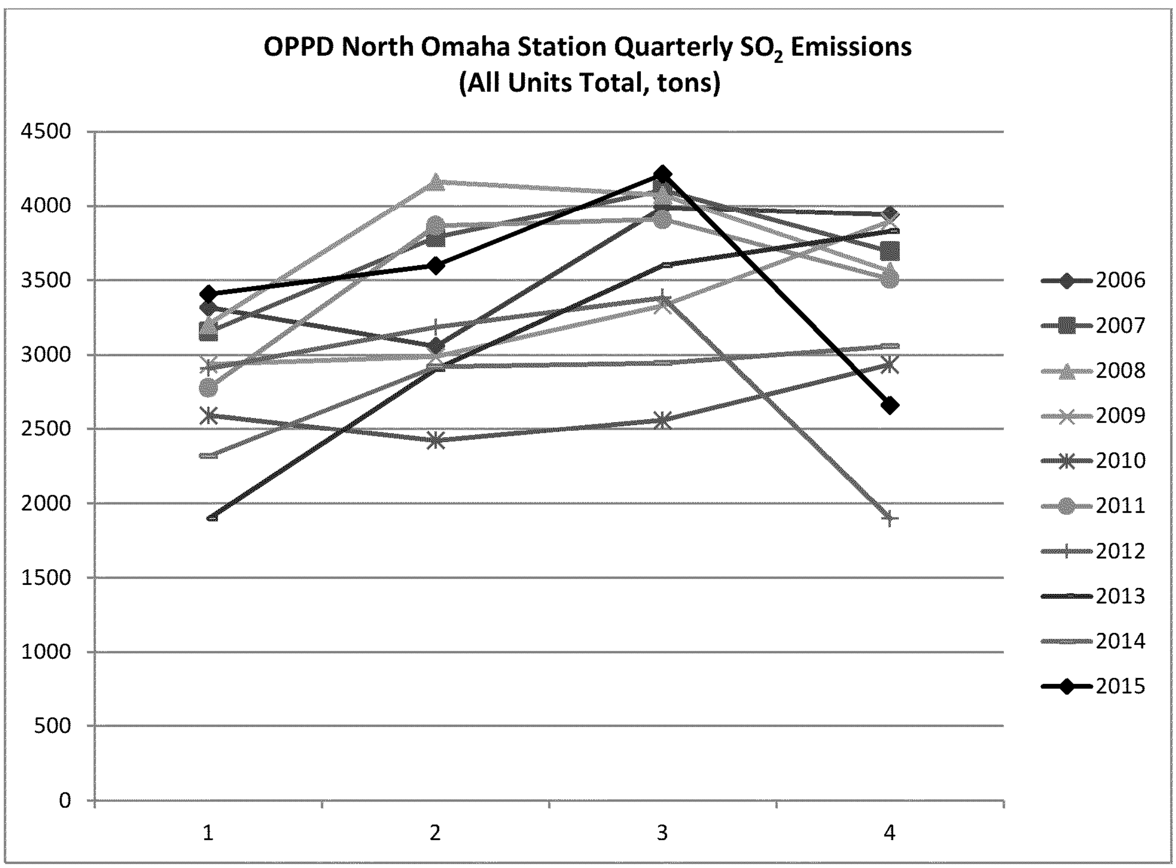

Figure Ad-2: OPPD North Omaha Station Quarterly SO_2 Emissions

Existing Air Quality Data

Due to existing SO_2 monitors in the Omaha area, including the Whitmore monitor, data are available to characterize air quality with respect to SO_2 for an extended period of time. As demonstrated in Figure Ad-3, excerpted from NDEQ's *2015 Ambient Air Monitoring Network Plan & Assessment*, there is a significant overall downward trend in maximum annual average SO_2 in the Omaha MSA since measurement collection began, and also a significant decline in the range of maximum annual values in more recent years.

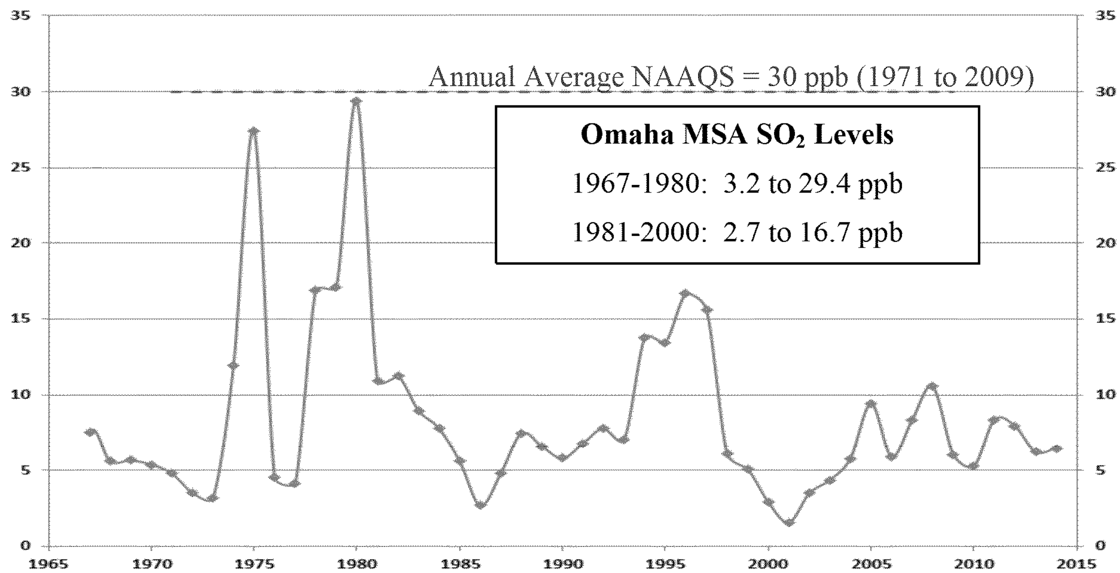

Figure Ad-3: Maximum Annual Average SO2 in Omaha MSA: 1967-2014

As demonstrated in Figure Ad-4, the Whitmore monitor has recorded an overall downward trend in annual 99th percentile SO_2 values since 2006, as well as declines in the three-year design values. No design values have exceeded the 2010 1-hour SO_2 NAAQS since 2009.

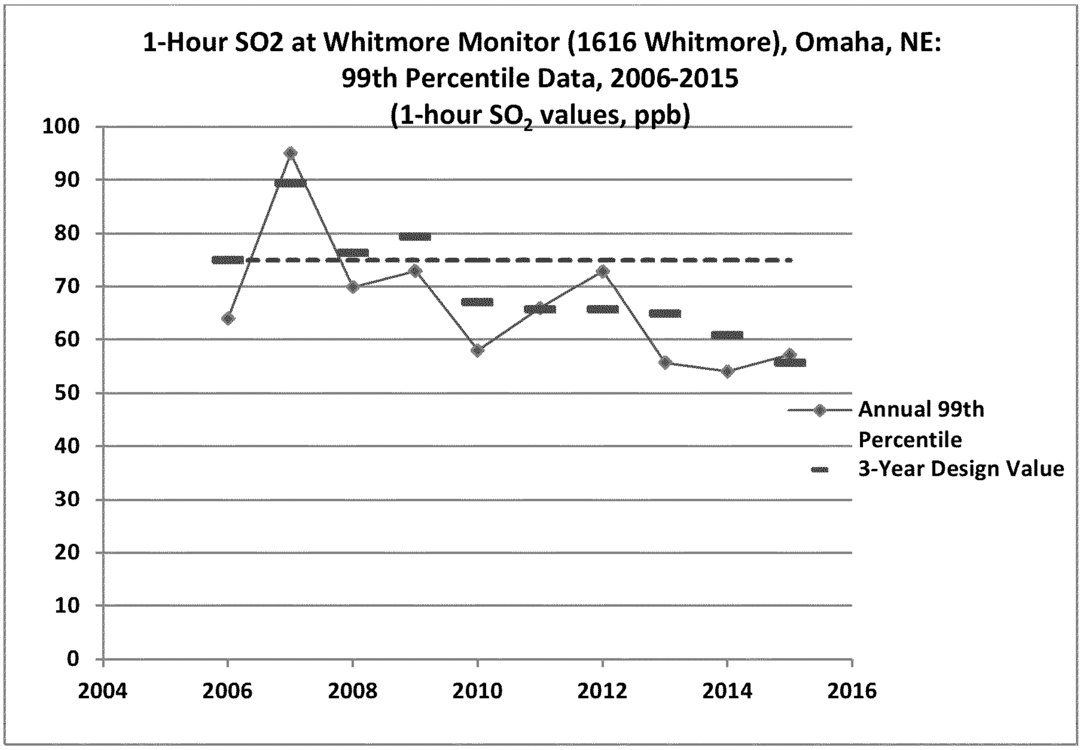

Figure Ad-4: 99th Percentile and Design Values of 1-hour SO_2 at Whitmore Monitor, 2006-2015

Modeling and Studies

A 1997 University of Nebraska master's thesis (*Examination of SO_2 Ambient Air Monitoring Location Using Air Dispersion Modeling* by Eitan Tsabari) examined SO_2 concentrations in the north Omaha area and the use of an air dispersion model to appropriately identify monitoring locations. The study identified the highest 1-hour SO_2 concentrations to the southeast of North Omaha Station, and modeled SO_2 concentrations (while consistently higher than measured concentrations) also fell within this area.

NDEQ conducted AERMOD modeling in June 2016 in support of considering monitor placement for North Omaha Station for DRR purposes. This more recent modeling indicates the highest average 1-hour SO_2 concentrations fall to the southeast and west of North Omaha Station, as indicated in Figure Ad-5.

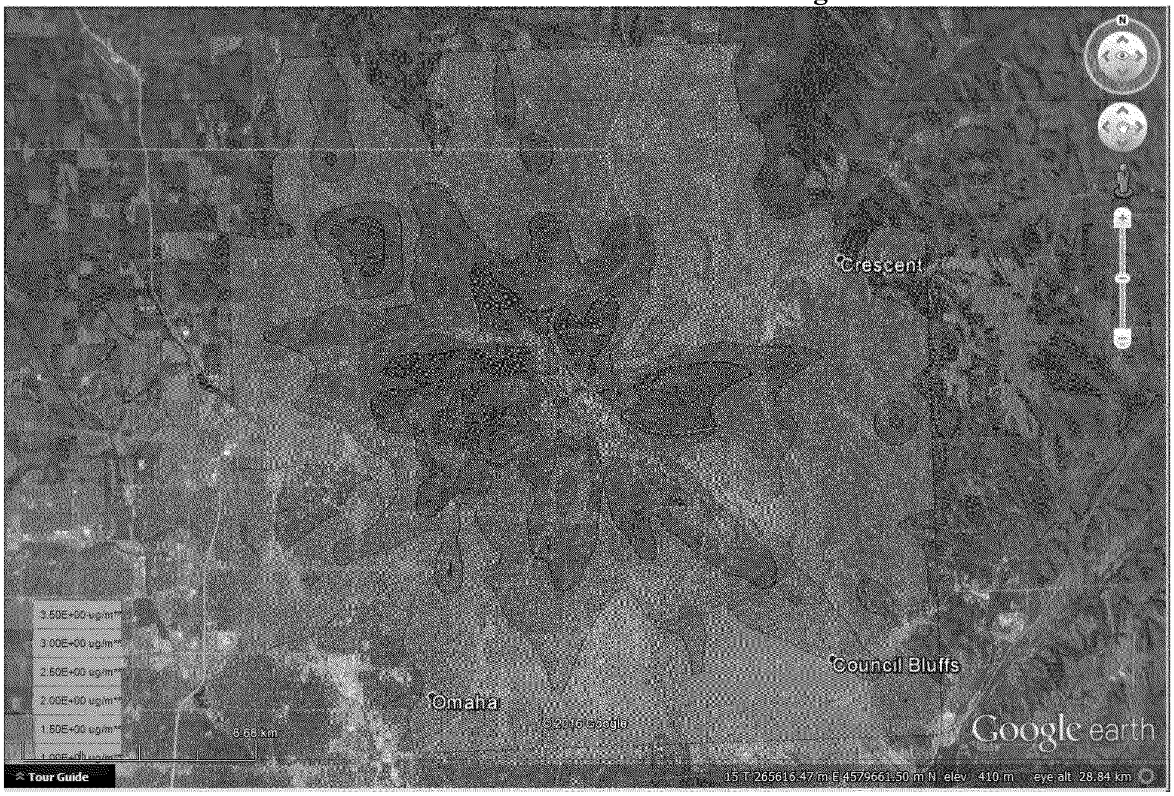

Figure Ad-5: NDEQ-modeled First-high Average 1-hour SO_2 Concentrations, 2016

Following original submission of the network monitoring plan to EPA on June 29, 2016, NDEQ and the Iowa Department of Natural Resources (IDNR) were contacted by EPA and requested to consider impacts from the Walter Scott Energy Center (approx. 19 km southeast) on North Omaha Station and vice versa, in part to consider whether the two sources should use the same data characterization method per the DRR, being in the same "area". IDNR produced modeling that demonstrated the impacts of emissions from North Omaha Station were not reciprocal to impacts from the Walter Scott Energy Center on North Omaha Station, and that attainment around the Walter Scott Energy Center would best be characterized through modeling, while attainment surrounding North Omaha Station could effectively be characterized through monitoring. EPA also requested additional modeling from NDEQ to further analyze the impacts of the Walter Scott Energy Center around North Omaha Station for purposes of monitor placement, and produce a ranking analysis that follows the recommended approach from the EPA 1-hr SO2 Monitoring Technical Assistance Document (TAD) and is similar to that found in the Georgia Department of Natural Resources 2016 Ambient Air Monitoring Plan. The dispersion modeling, which used 3 years (2012-2014) of normalized emissions data from North Omaha and Walter Scott was conducted in cooperation with EPA Region 7 staff, through approved protocols.

The MAXDAILY output file produced by AERMOD was analyzed using Excel spreadsheet formulae to determine, for each modeled day of meteorology, the receptor with the maximum 1-hour SO2 concentration on that day and is combined with the 4th highest maximum 1-hr SO2 modeled concentration to produce a receptor score. From this, the top 100 receptors were ranked (Table Ad-1 and Figure Ad-6), with the lowest scores representing the top ranked receptors.

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
253661.1 4580764.4	4	3.60068	65	164	229
250911.1 4578514.4	6	3.01916	47	182	229
253090.9 4579683.8	1	7.90919	174	54	228
247911.1 4581014.4	2	5.43359	116	110	226
252411.1 4578764.4	2	5.5969	116	106	222
253661.1 4578264.4	1	8.44074	174	46	220
252911.1 4580264.4	5	3.55149	53	167	220
251911.1 4580264.4	1	8.61063	174	45	219
251661.1 4581764.4	1	8.63094	174	44	218
249911.1 4584014.4	1	8.6461	174	43	217
251911.1 4578014.4	4	3.92929	65	150	215
254161.1 4580014.4	3	4.96206	89	125	214
251661.1 4578764.4	1	9.04993	174	36	210
253056 4580098.5	3	5.08667	89	121	210
253778 4579345.2	2	6.01046	116	93	209
251911.1 4577764.4	3	5.1654	89	119	208
250911.1 4586264.4	2	6.12349	116	90	206
250661.1 4582514.4	1	9.27907	174	31	205
250911.1 4583764.4	1	9.29149	174	30	204
252161.1 4578264.4	1	9.57256	174	28	202
253072.1 4579782	2	6.23888	116	85	201
253649.8 4579068.3	2	6.26343	116	84	200
249411.1 4582764.4	1	9.7304	174	25	199
253911.1 4578514.4	5	4.3059	53	146	199
248161.1 4580514.4	2	6.42779	116	81	197
253411.1 4578264.4	2	6.48141	116	80	196

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location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
252161.1 4577764.4	2	6.52924	116	79	195
253745.4 4579494.9	3	5.63415	89	105	194
252661.1 4579764.4	2	6.66788	116	74	190
248411.1 4582014.4	1	10.67337	174	15	189
253670.1 4579560.7	2	6.72931	116	71	187
253661.1 4579014.4	2	6.82083	116	69	185
253081.5 4579732.9	2	6.92502	116	67	183
253161.1 4578514.4	7	4.40795	37	143	180
253181.1 4579988.9	3	6.18878	89	87	176
253911.1 4578764.4	10	3.85841	22	154	176
253444.4 4579758.4	2	8.17908	116	49	165
253100.2 4579634.7	2	8.35747	116	48	164
248661.1 4582014.4	3	6.65851	89	75	164
249911.1 4585764.4	2	8.37373	116	47	163
253911.1 4580014.4	7	5.0618	37	124	161
250161.1 4579264.4	2	8.92528	116	40	156
252911.1 4579514.4	2	8.93183	116	39	155
251161.1 4578514.4	3	7.1286	89	66	155
250161.1 4585014.4	2	9.00141	116	37	153
252661.1 4579014.4	3	7.20133	89	64	153
253557.3 4579659.5	3	7.55158	89	61	150
253661.1 4580014.4	6	5.67643	47	103	150
253411.1 4580514.4	4	6.28314	65	83	148
253411.1 4578514.4	3	7.82657	89	56	145
253661.1 4580514.4	6	5.84887	47	98	145
250161.1 4583014.4	2	9.67187	116	26	142

Addendum to the 2016 Ambient Air Monitoring Network Plan

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location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
253594.9 4579626.6	4	6.63399	65	76	141
250411.1 4581764.4	2	9.85925	116	24	140
253911.1 4580264.4	7	5.74945	37	100	137
253248.1 4579237	4	6.79289	65	70	135
253692.4 4579094.4	7	5.85256	37	97	134
253109.6 4579585.5	3	8.65345	89	42	131
253283.4 4579201.5	4	7.14351	65	65	130
252411.1 4579514.4	4	7.93854	65	53	118
252911.1 4579014.4	5	7.30569	53	63	116
253119 4579536.4	4	8.14088	65	50	115
253353.8 4579130.6	5	7.71737	53	58	111
252911.1 4579264.4	5	7.90059	53	55	108
250411.1 4582014.4	3	10.74439	89	14	103
249911.1 4583014.4	4	9.10055	65	33	98
253256.3 4579923.1	7	8.04318	37	52	89
253389.1 4579095.1	4	9.94604	65	20	85
253411.1 4580014.4	5	9.15268	53	32	85
251411.1 4581764.4	4	10.4599	65	17	82
253218.7 4579956	10	7.55485	22	60	82
253161.1 4580264.4	16	6.68595	8	72	80
251411.1 4580264.4	4	10.9018	65	13	78
253607.2 4579042.2	7	8.78206	37	41	78
251661.1 4582014.4	4	11.57316	65	11	76
253409.2 4579074.8	4	11.61527	65	10	75
253632.5 4579593.7	6	9.64629	47	27	74
253430.4	4	13.01129	65	6	71

Addendum to the 2016 Ambient Air Monitoring Network Plan

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
4579071.8					
253406.8 4579791.3	6	10.45729	47	18	65
253161.1 4580514.4	20	7.55502	5	59	64
253411.1 4579014.4	5	11.80037	53	9	62
251911.1 4580514.4	5	11.94383	53	8	61
253661.1 4580264.4	24	7.73063	3	57	60
253411.1 4578764.4	7	9.92953	37	21	58
253519.7 4579692.5	10	9.07595	22	34	56
253661.1 4578514.4	11	8.97698	18	38	56
253411.1 4580264.4	37	8.11045	1	51	52
253661.1 4578764.4	17	9.06968	7	35	42
253294 4579890.1	10	10.13393	22	19	41
252661.1 4579514.4	11	9.90786	18	22	40
253161.1 4578764.4	15	9.4022	10	29	39
253494.8 4578973.3	8	13.9279	33	3	36
253431.9 4579071.6	9	13.20433	29	5	34
253485 4578988.7	9	14.03447	29	2	31
253161.1 4579014.4	16	9.86968	8	23	31
253564.5 4579016	10	12.36971	22	7	29
253331.6 4579857.2	15	10.669	10	16	26
253458 4579030.8	10	14.25943	22	1	23
253369.2 4579824.2	21	11.51426	4	12	16
253521.9 4578989.9	19	13.32461	6	4	10

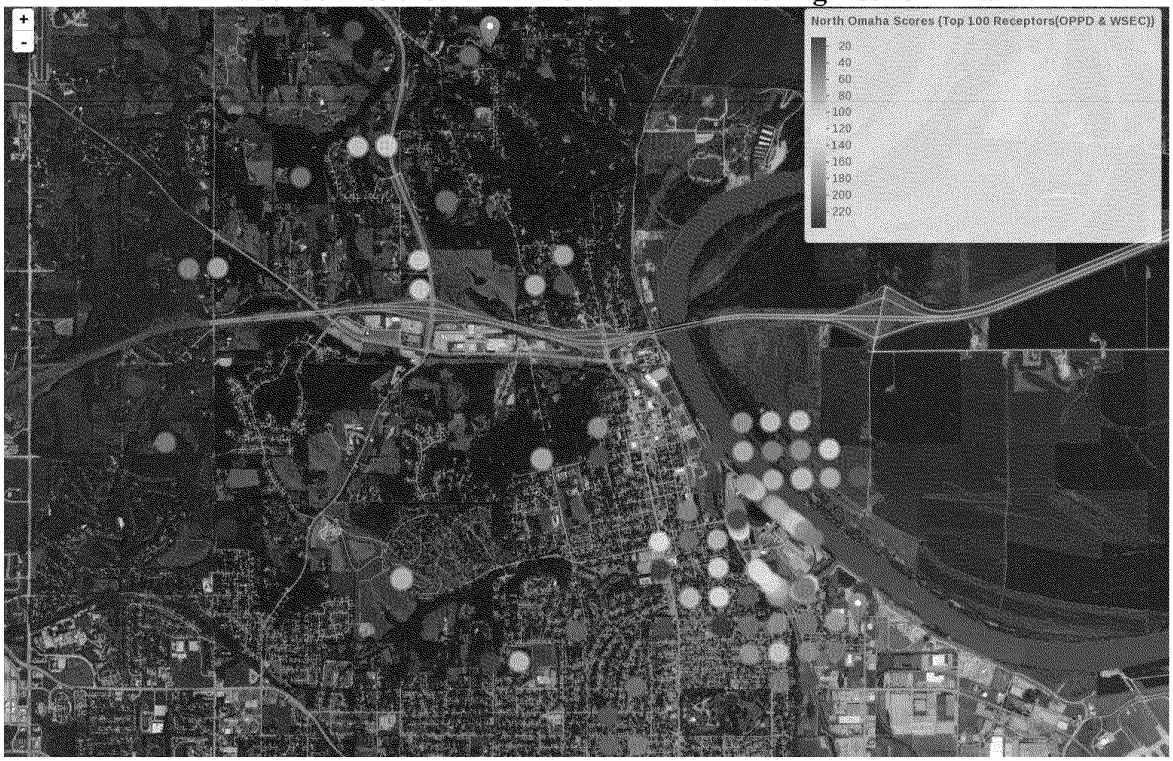

Figure Ad-6: Top 100 Receptor Locations Surrounding North Omaha Station. The lowest total scores (red dots) represent the top ranked receptor locations.

As Figure Ad-6 demonstrates, the cluster of highest-ranked receptors not in the Missouri River or along its banks (and therefore in danger of flooding) appear south of North Omaha Station. The proposed monitoring location is in this area.

Meteorological Data

As shown in Figure Ad-7, wind roses from the nearest meteorological stations (OMA and CBF) indicate general prevalent wind direction in the area as NW/NNW or S/SSE.

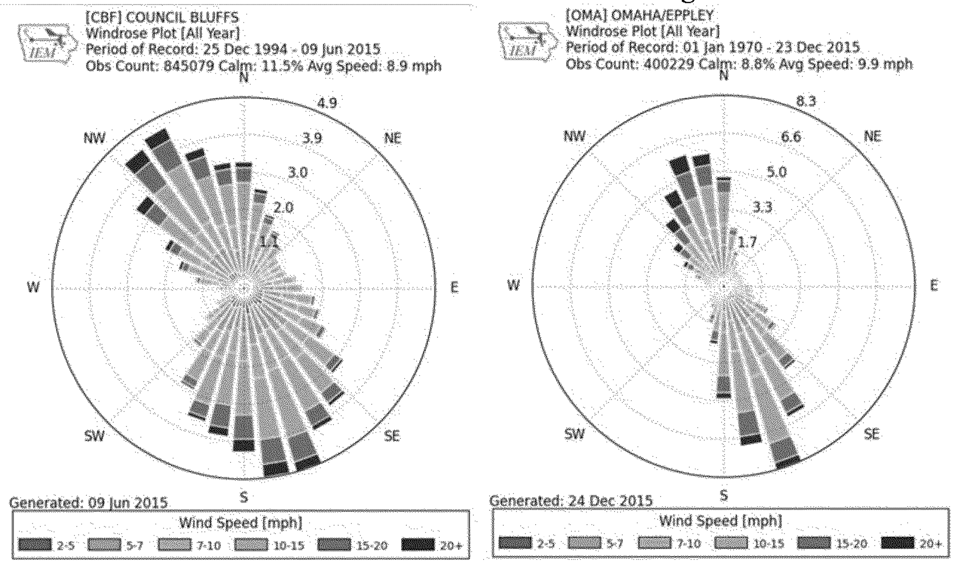

Figure Ad-7: Omaha Area Wind Roses

Geographic Influences

As indicated in Figure Ad-6, much of the area south of OPPD's North Omaha Station consists of metropolitan development, while much of the area north and west of North Omaha Station is wooded or farmland. It should be noted that an SO_2 monitor was previously placed in the wooded area north of North Omaha Station, but was decommissioned in 2010 due to consistently low recordings; it is likely that this monitor was impacted by tree canopy.

Site Determination

Through the additional modeling conducted by NDEQ and EPA Region 7 staff, NDEQ was able to narrow down a proposed site location. Installation of a monitor in or along the Missouri River would be infeasible, as would installation of a monitor within residential neighborhoods or in wooded areas. The remaining most feasible location is in the vicinity of the ballfields/parking area immediately south of the power plant, along John J. Pershing Drive. This is the proposed monitoring location (Figure Ad-8).

Figure Ad-8: Proposed DRR Monitoring Location for North Omaha Station

EPA Region 7 staff visited the site on November 9, 2016 and confirmed there were no concerns with the location in terms of interference from the roadway or rail line, and that it was appropriately placed to monitor the most feasible area of highest impact as indicated by the cluster of receptors as shown in Figure Ad-6.

The proposed site is fairly level with no trees or other major concerns for placement of the monitor and supporting equipment. Figure Ad-9 provides photos of the proposed site and its surroundings.

Figure Ad-9: Photos of Proposed DRR Monitoring Location for North Omaha Station

1. From proposed site, looking north toward North Omaha Station
2. From proposed site, looking east

Figure Ad-9 (cont'd): Photos of Proposed DRR Monitoring Location for North Omaha Station

3. From proposed site, looking south toward John J. Pershing Drive

4. From proposed site, looking west

Because the existing Whitmore monitoring site was placed specifically to capture SO_2 readings from North Omaha Station in an economically disadvantaged area for environmental justice purposes, the NDEQ feels that Whitmore and this single additional proposed monitoring location will satisfy DRR needs. Further, given the expected drastic reduction and possible near-elimination of SO_2 emissions from this facility (given halted operation with coal of Units 1-3 and impending conversion of Units 4 and 5 to natural gas in the coming years), NDEQ feels that additional investment in installing monitors for this source would be an unwise expenditure of limited funding and resources.

NDEQ will provide a trailer to house the monitor and supporting equipment, while the Douglas County Health Department will provide the monitor and supporting equipment. OPPD will provide electricity and fencing around the trailer. Douglas County Health Department will operate the monitor.

Proposed SO_2 Monitoring Site: Additional Information and Part 58 Compliance Review

The proposed SO_2 monitoring location is to be a micro-scale, source-oriented site with respect to OPPD's North Omaha Station, a coal-fired electrical generating unit in Omaha, NE. The site is on the south end of the North Omaha Station property and adjacent to a public parking area associated with ball fields at that location. The approximate Lat/Long coordinates are 41° 19' 32" N and 95° 56' 46" W. The site is ~40 m east of Pershing Drive and 15 m north of a rail car parking area. The location of the proposed site is shown in Figure Ad-8. Also see photos of site location in Figure Ad-9.

The proposed site will meet applicable requirements of 40 CFR Part 58. A compliance review with respect to Part 58 Appendixes A thru E is provided below.

Appendix A - QA Requirements for Monitors used for NAAQS Evaluations: The Douglas County Health Department (DCHD) will operate the site. DCHD has experience operating SO_2 sites and meeting Appendix A QA requirements. Operating, maintenance and QA requirements will comply with the requirements of the *Quality Assurance Project Plan (QAPP)for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation and Total Reduced Sulfur* (EPA approved 11/24/14).

Appendix B - QA Requirements for PSD Monitors: Not applicable. This will not be a PSD air monitoring site.

Appendix C – Ambient Air Quality Monitoring Methodology: The proposed site will utilize a continuous FEM SO_2 analyzer capable of taking 1-minute SO_2 readings.

Other equipment will include a data logger or computer capable of storing the 1-minute analyzer data; and two sets of calibration equipment (i.e., a calibrator, a zero air system and EPA-protocol SO_2 calibration gas). One set is for annual calibration and biweekly zero/span/precision checks and the other is for audits.

The make and model of the FEM analyzer, calibrator and zero air system have not been finalized. The FEM analyzer will be either purchased as a new unit or be no more than 5 years old. The calibrator and zero air system used will meet the specifications required for the FEM analyzer. All equipment will meet 40 CFR Part 58 Appendix C requirements.

Analytical equipment will be housed in a temperature-controlled enclosure that maintains interior temperatures between 20° to 30° C.

Appendix D – Network Design Criteria: Modeling was performed to identify the highest concentration area for the site. The proposed location meets the criteria for a microscale site as set forth in Appendix E Section 4.4.

Appendix E - Probe and Monitoring Path Siting Criteria: The preliminary site review sheet (below) demonstrates that the site will meet Appendix E requirements.

Nebraska NAMS/SLAMS Siting Criteria Review Sheet for Sulfur Dioxide

Pre-Siting Review for proposed SO_2 site at NPPD's Sheldon Station

Agency: Nebraska Department of Environmental Quality :

Location: 7475 Pershing Drive, Omaha, NE
Approximately 425 m SSE of the main entrance to the OPPD Nor th Omaha Station main entrance and ~ 40 m east of Pershing Drive
Approximate Lat/Long 41° 19' 32" N and 95° 56' 46" W

AIRS Site ID: Proposed site - To be assigned (31-055-nnnn)

Date: November 10, 2016

Reviewer: Jim Yeggy

Monitoring Objective: Source-oriented		Scale: Micro-scale
40 CFR Part 58 Appendix E Criteria	**Requirements**	**Review Comments**
Section 2: Horizontal & vertical probe placement	2 to 15 m above ground	Analyzer will be housed within an enclosed trailer or dedicated enclosure structure. Inlet will be constructed to comply with inlet placement criteria . Anticipated inlet height ~3 m.
	At least 1 m from supporting structure	
	If on side of building, should be on side of prevailing winter wind	Not applicable.
Section 3: Spacing from minor sources	No furnace or other minor SO_2 sources nearby	OK. There is a railcar parking area ~ 15 m south of the site, but the locomotive engines used to park the cars maintain a distance of 1500 feet from the monitoring site.
Section 4: Spacing from obstructions	Distance from obstacle to probe at least 2x the obstacle height above the probe	OK. The North Omaha Station stacks range are 204 feet high , and are located 400 to 480 m north of the monitoring site. There are no obstructions between the stacks and the monitoring site.
	Exceptions for street canyon or building mounted inlets	Not applicable
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NDEQ Document # 16-020a

Date: November 17, 2016

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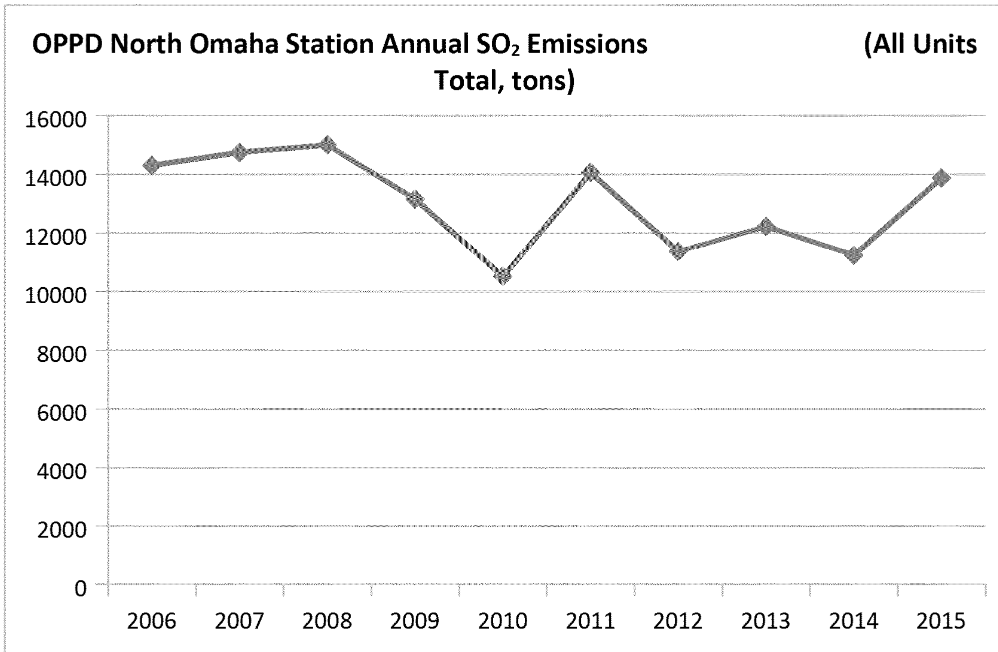
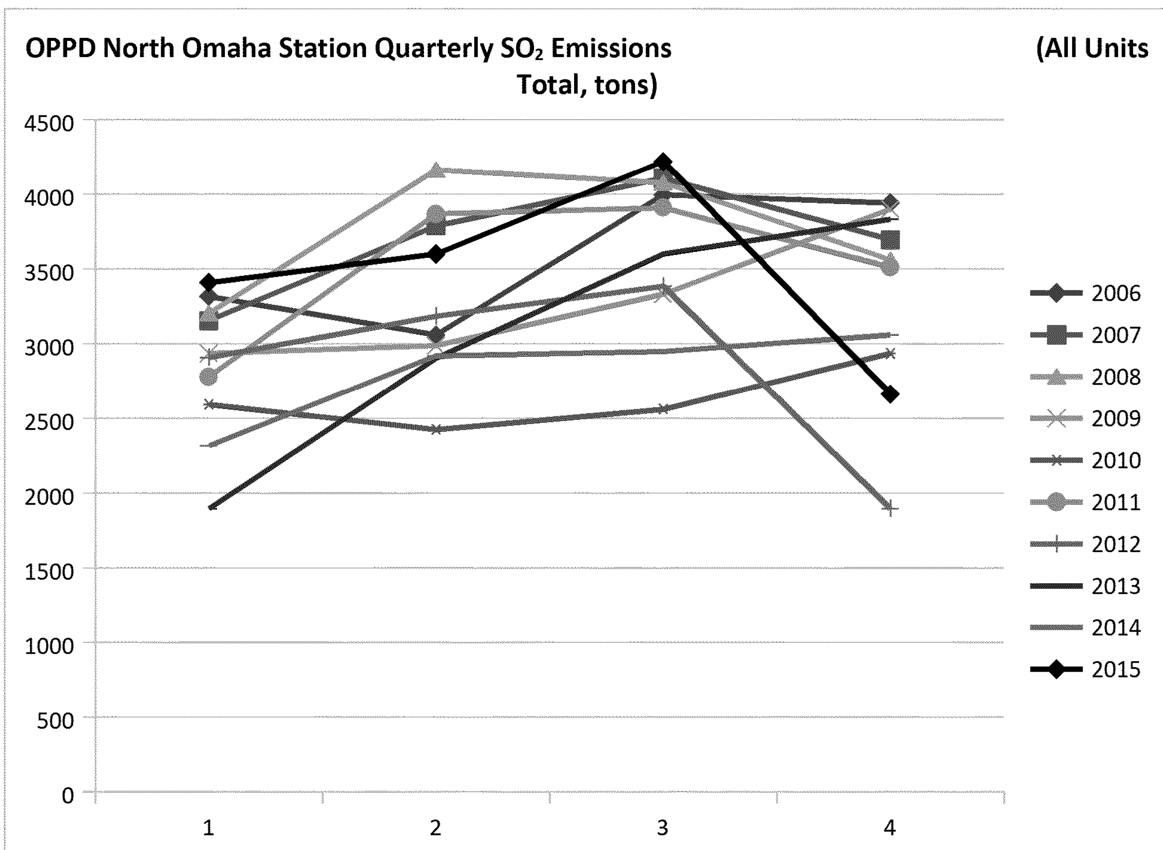


Figure Ad-1: OPPD North Omaha Station Annual SO_2 Emissions



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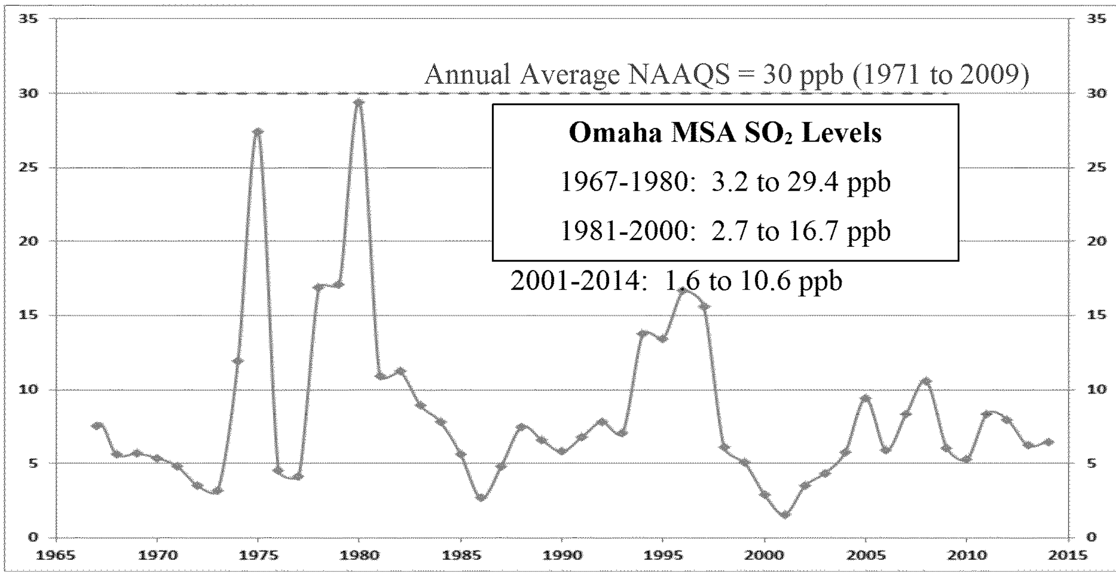

Figure Ad-3: Maximum Annual Average SO2 in Omaha MSA: 1967-2014

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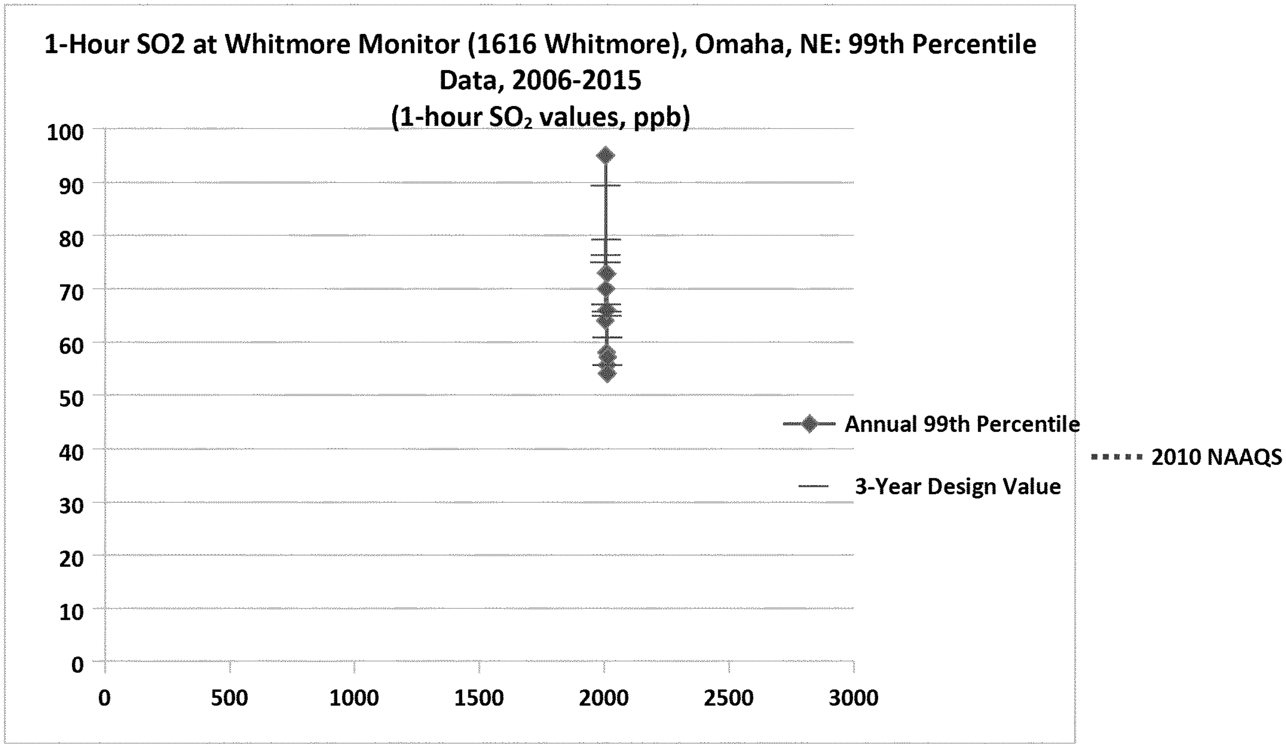

Figure Ad-4: 99th Percentile and Design Values of 1-hour SO_2 at Whitmore Monitor, 2006-2015

Modeling and Studies

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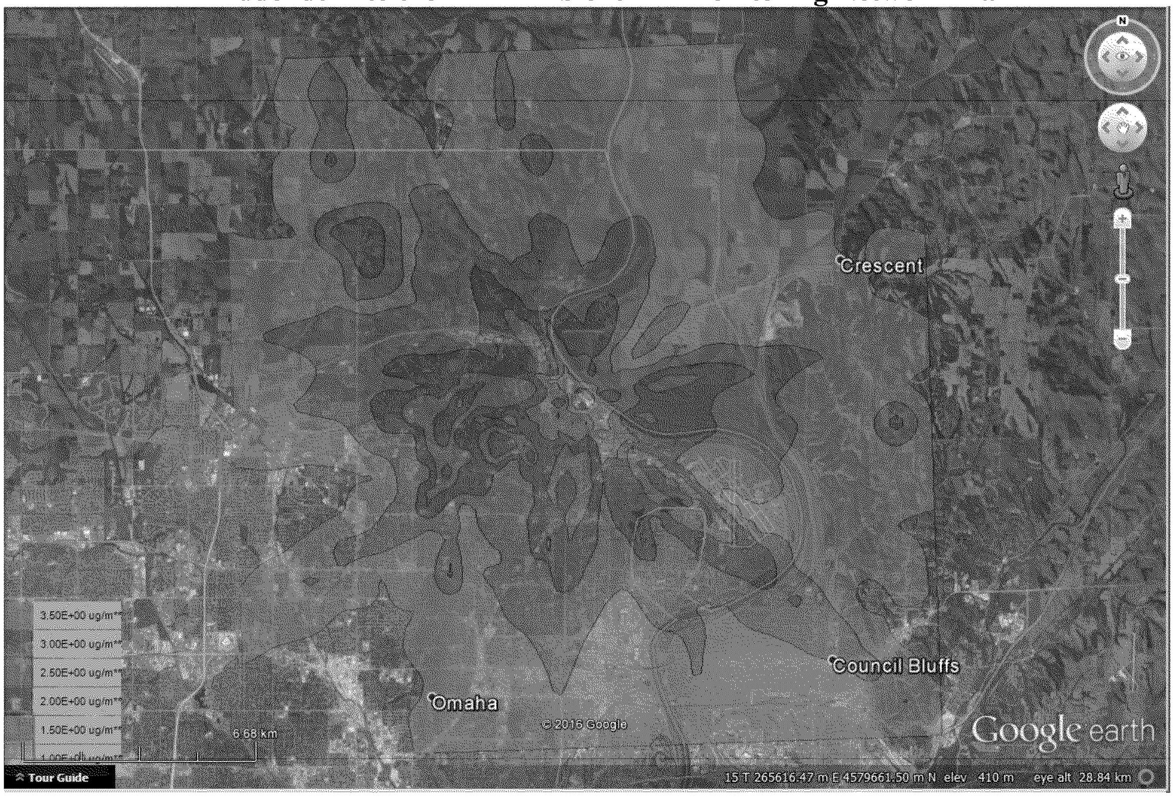

Figure Ad-5: NDEQ-modeled First-high Average 1-hour SO_2 Concentrations, 2016

Following original submission of the network monitoring plan to EPA on June 29, 2016, NDEQ and the Iowa Department of Natural Resources (IDNR) were contacted by EPA and requested to consider impacts from the Walter Scott Energy Center (approx. 19 km southeast) on North Omaha Station and vice versa, in part to consider whether the two sources should use the same data characterization method per the DRR, being in the same "area". IDNR produced modeling that demonstrated the impacts of emissions from North Omaha Station were not reciprocal to impacts from the Walter Scott Energy Center on North Omaha Station, and that attainment around the Walter Scott Energy Center would best be characterized through modeling, while attainment surrounding North Omaha Station could effectively be characterized through monitoring. EPA also requested additional modeling from NDEQ to further analyze the impacts of the Walter Scott Energy Center around North Omaha Station for purposes of monitor placement, and produce a ranking analysis that follows the recommended approach from the EPA 1-hr SO2 Monitoring Technical Assistance Document (TAD) and is similar to that found in the Georgia Department of Natural Resources 2016 Ambient Air Monitoring Plan. The dispersion modeling, which used 3 years (2012-2014) of normalized emissions data from North Omaha and Walter Scott was conducted in cooperation with EPA Region 7 staff, through approved protocols.

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253090.9 4579683.8	1	7.90919	174	54	228
247911.1 4581014.4	2	5.43359	116	110	226
252411.1 4578764.4	2	5.5969	116	106	222
253661.1 4578264.4	1	8.44074	174	46	220
252911.1 4580264.4	5	3.55149	53	167	220
251911.1 4580264.4	1	8.61063	174	45	219
251661.1 4581764.4	1	8.63094	174	44	218
249911.1 4584014.4	1	8.6461	174	43	217
251911.1 4578014.4	4	3.92929	65	150	215
254161.1 4580014.4	3	4.96206	89	125	214
251661.1 4578764.4	1	9.04993	174	36	210
253056 4580098.5	3	5.08667	89	121	210
253778 4579345.2	2	6.01046	116	93	209
251911.1 4577764.4	3	5.1654	89	119	208
250911.1 4586264.4	2	6.12349	116	90	206
250661.1 4582514.4	1	9.27907	174	31	205
250911.1 4583764.4	1	9.29149	174	30	204
252161.1 4578264.4	1	9.57256	174	28	202
253072.1 4579782	2	6.23888	116	85	201
253649.8 4579068.3	2	6.26343	116	84	200
249411.1 4582764.4	1	9.7304	174	25	199
253911.1 4578514.4	5	4.3059	53	146	199
248161.1 4580514.4	2	6.42779	116	81	197
253411.1 4578264.4	2	6.48141	116	80	196

252161.1 4577764.4	2	6.52924	116	79	195
253745.4 4579494.9	3	5.63415	89	105	194
252661.1 4579764.4	2	6.66788	116	74	190
248411.1 4582014.4	1	10.67337	174	15	189
253670.1 4579560.7	2	6.72931	116	71	187
253661.1 4579014.4	2	6.82083	116	69	185
253081.5 4579732.9	2	6.92502	116	67	183
253161.1 4578514.4	7	4.40795	37	143	180
253181.1 4579988.9	3	6.18878	89	87	176
253911.1 4578764.4	10	3.85841	22	154	176
253444.4 4579758.4	2	8.17908	116	49	165
253100.2 4579634.7	2	8.35747	116	48	164
248661.1 4582014.4	3	6.65851	89	75	164
249911.1 4585764.4	2	8.37373	116	47	163
253911.1 4580014.4	7	5.0618	37	124	161
250161.1 4579264.4	2	8.92528	116	40	156
252911.1 4579514.4	2	8.93183	116	39	155
251161.1 4578514.4	3	7.1286	89	66	155
250161.1 4585014.4	2	9.00141	116	37	153
252661.1 4579014.4	3	7.20133	89	64	153
253557.3 4579659.5	3	7.55158	89	61	150
253661.1 4580014.4	6	5.67643	47	103	150
253411.1 4580514.4	4	6.28314	65	83	148
253411.1 4578514.4	3	7.82657	89	56	145
253661.1 4580514.4	6	5.84887	47	98	145
250161.1 4583014.4	2	9.67187	116	26	142
253594.9 4579626.6	4	6.63399	65	76	141
250411.1 4581764.4	2	9.85925	116	24	140

253911.1 4580264.4	7	5.74945	37	100	137
253248.1 4579237	4	6.79289	65	70	135
253692.4 4579094.4	7	5.85256	37	97	134
253109.6 4579585.5	3	8.65345	89	42	131
253283.4 4579201.5	4	7.14351	65	65	130
252411.1 4579514.4	4	7.93854	65	53	118
252911.1 4579014.4	5	7.30569	53	63	116
253119 4579536.4	4	8.14088	65	50	115
253353.8 4579130.6	5	7.71737	53	58	111
252911.1 4579264.4	5	7.90059	53	55	108
250411.1 4582014.4	3	10.74439	89	14	103
249911.1 4583014.4	4	9.10055	65	33	98
253256.3 4579923.1	7	8.04318	37	52	89
253389.1 4579095.1	4	9.94604	65	20	85
253411.1 4580014.4	5	9.15268	53	32	85
251411.1 4581764.4	4	10.4599	65	17	82
253218.7 4579956	10	7.55485	22	60	82
253161.1 4580264.4	16	6.68595	8	72	80
251411.1 4580264.4	4	10.9018	65	13	78
253607.2 4579042.2	7	8.78206	37	41	78
251661.1 4582014.4	4	11.57316	65	11	76
253409.2 4579074.8	4	11.61527	65	10	75
253632.5 4579593.7	6	9.64629	47	27	74
253430.4 4579071.8	4	13.01129	65	6	71
253406.8 4579791.3	6	10.45729	47	18	65
253161.1 4580514.4	20	7.55502	5	59	64
253411.1 4579014.4	5	11.80037	53	9	62
251911.1 4580514.4	5	11.94383	53	8	61

253661.1 4580264.4	24	7.73063	3	57	60
253411.1 4578764.4	7	9.92953	37	21	58
253519.7 4579692.5	10	9.07595	22	34	56
253661.1 4578514.4	11	8.97698	18	38	56
253411.1 4580264.4	37	8.11045	1	51	52
253661.1 4578764.4	17	9.06968	7	35	42
253294 4579890.1	10	10.13393	22	19	41
252661.1 4579514.4	11	9.90786	18	22	40
253161.1 4578764.4	15	9.4022	10	29	39
253494.8 4578973.3	8	13.9279	33	3	36
253431.9 4579071.6	9	13.20433	29	5	34
253485 4578988.7	9	14.03447	29	2	31
253161.1 4579014.4	16	9.86968	8	23	31
253564.5 4579016	10	12.36971	22	7	29
253331.6 4579857.2	15	10.669	10	16	26
253458 4579030.8	10	14.25943	22	1	23
253369.2 4579824.2	21	11.51426	4	12	16
253521.9 4578989.9	19	13.32461	6	4	10

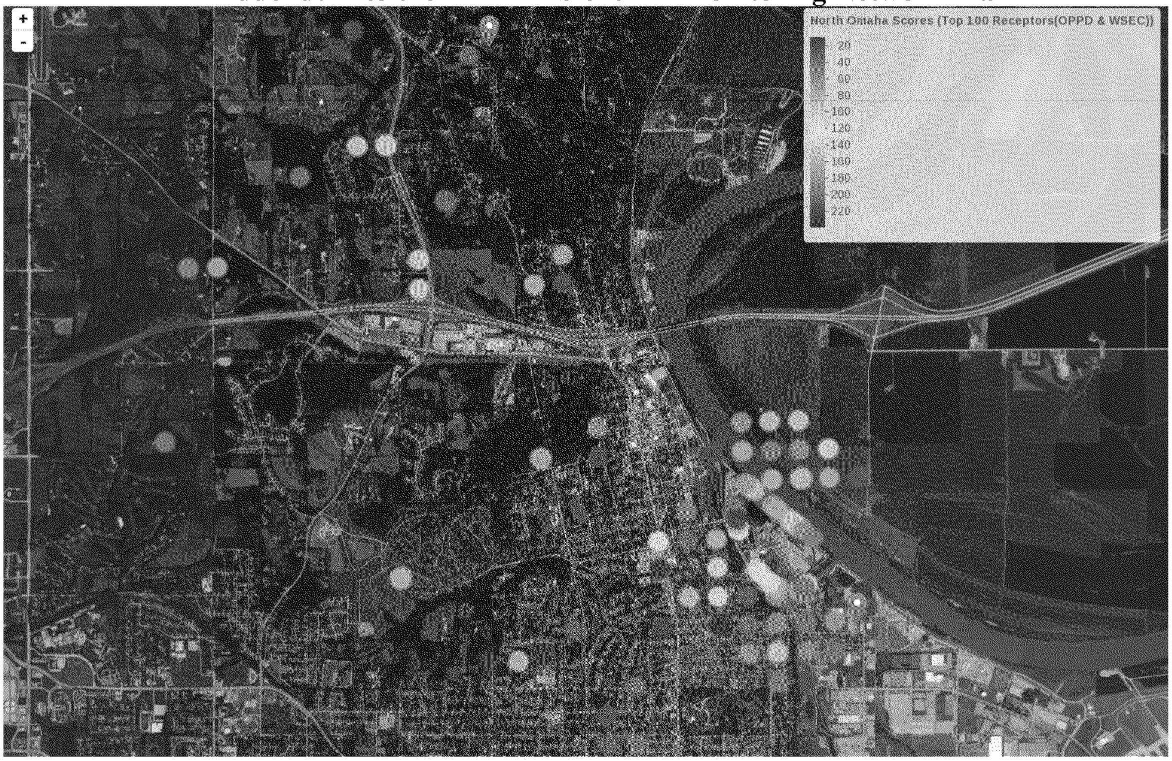

Figure Ad-6: Top 100 Receptor Locations Surrounding North Omaha Station. The lowest total scores (red dots) represent the top ranked receptor locations.

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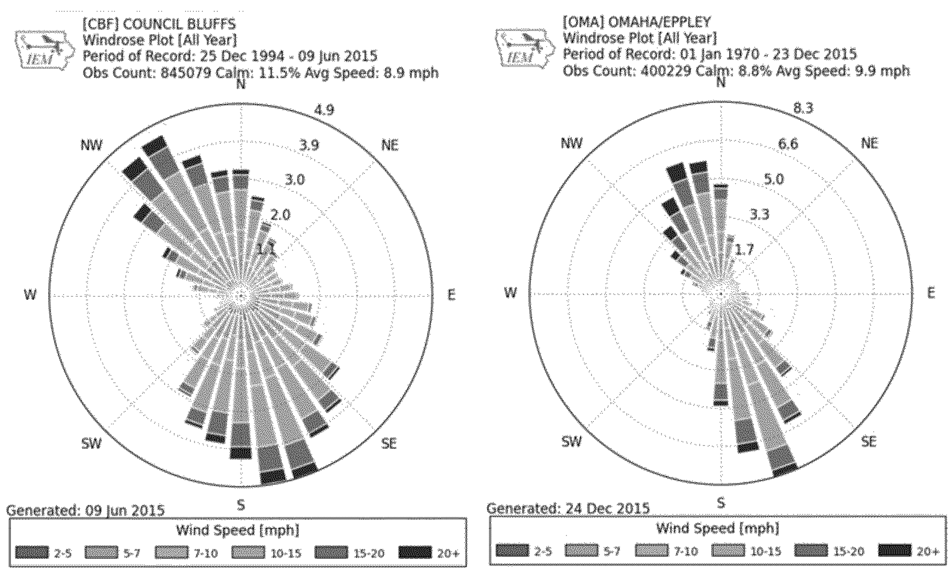
As shown in Figure Ad-7, wind roses from the nearest meteorological stations (OMA and CBF) indicate general prevalent wind direction in the area as NW/NNW or S/SSE.



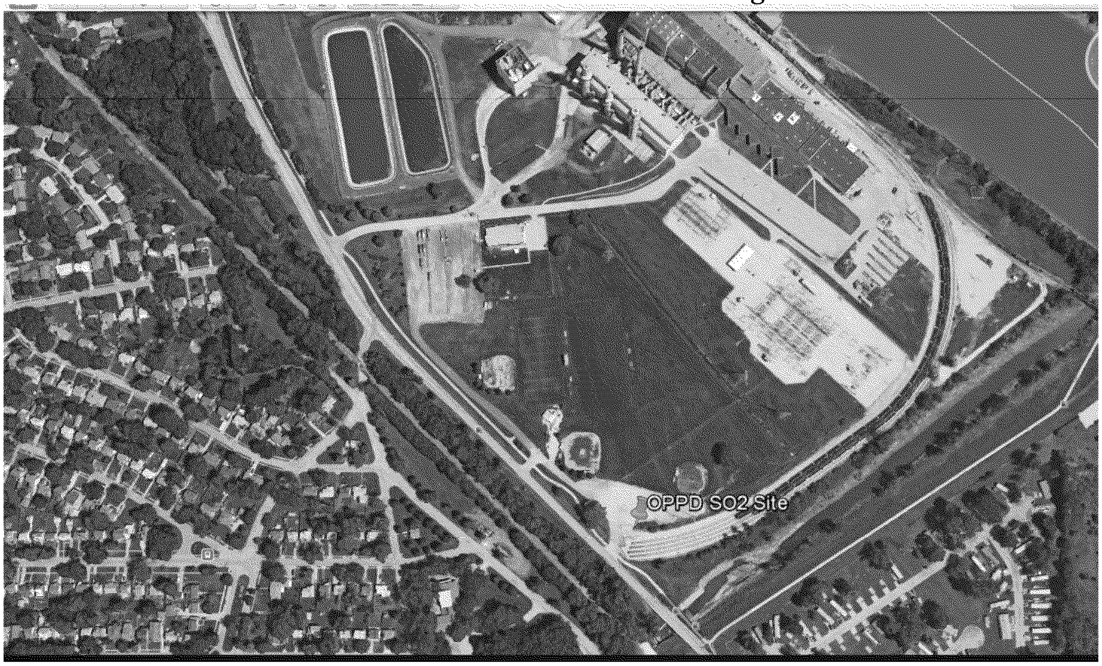


Figure Ad-8: Proposed DRR Monitoring Location for North Omaha Station

Figure Ad-7: Omaha Area Wind Roses

Geographic Influences

As indicated in Figure Ad-6, much of the area south of OPPD's North Omaha Station consists of metropolitan development, while much of the area north and west of North Omaha Station is wooded or farmland. It should be noted that an SO_2 monitor was previously placed in the wooded area north of North Omaha Station, but was decommissioned in 2010 due to consistently low recordings; it is likely that this monitor was impacted by tree canopy.

Site Determination

Through the additional modeling conducted by NDEQ and EPA Region 7 staff, NDEQ was able to narrow down a proposed site location. Installation of a monitor in or along the Missouri River would be infeasible, as would installation of a monitor within residential neighborhoods or in wooded areas. The remaining most feasible location is in the vicinity of the ballfields/parking area immediately south of the power plant, along John J. Pershing Drive. This is the proposed monitoring location (Figure Ad-8).

EPA Region 7 staff visited the site on November 9, 2016 and confirmed there were no concerns with the location in terms of interference from the roadway or rail line, and that it was appropriately placed to monitor the most feasible area of highest impact as indicated by the cluster of receptors as shown in Figure Ad-6.

The proposed site is fairly level with no trees or other major concerns for placement of the monitor and supporting equipment. Figure Ad-9 provides photos of the proposed site and its surroundings.

Figure Ad-9: Photos of Proposed DRR Monitoring Location for North Omaha Station

1. From proposed site, looking north toward North Omaha Station
2. From proposed site, looking east

Figure Ad-9 (cont'd): Photos of Proposed DRR Monitoring Location for North Omaha Station

3. From proposed site, looking south toward John J. Pershing Drive
4. From proposed site, looking west

Because the existing Whitmore monitoring site was placed specifically to capture SO_2 readings from North Omaha Station in an economically disadvantaged area for environmental justice purposes, the NDEQ feels that Whitmore and this single additional proposed monitoring location will satisfy DRR needs. Further, given the expected drastic reduction and possible near-elimination of SO_2 emissions from this facility (given halted operation with coal of Units 1-3 and impending conversion of Units 4 and 5 to natural gas in the coming years), NDEQ feels that additional investment in installing monitors for this source would be an unwise expenditure of limited funding and resources.

NDEQ will provide a trailer to house the monitor and supporting equipment, while the Douglas County Health Department will provide the monitor and supporting equipment. OPPD will provide electricity and fencing around the trailer. Douglas County Health Department will operate the monitor.

Proposed SO_2 Monitoring Site: Additional Information and Part 58 Compliance Review

The proposed SO_2 monitoring location is to be a micro-scale, source-oriented site with respect to OPPD's North Omaha Station, a coal-fired electrical generating unit in Omaha, NE. The site is on the south end of the North Omaha Station property and adjacent to a public parking area associated with ball fields at that location. The approximate Lat/Long coordinates are 41° 19' 32" N and 95° 56' 46" W. The site is ~40 m east of Pershing Drive and 15 m north of a rail car parking area. The location of the proposed site is shown in Figure Ad-8. Also see photos of site location in Figure Ad-9.

The proposed site will meet applicable requirements of 40 CFR Part 58. A compliance review with respect to Part 58 Appendixes A thru E is provided below.

Appendix A - QA Requirements for Monitors used for NAAQS Evaluations: The Douglas County Health Department (DCHD) will operate the site. DCHD has experience operating SO_2 sites and meeting Appendix A QA requirements. Operating, maintenance and QA requirements will comply with the requirements of the *Quality Assurance Project Plan (QAPP)for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation and Total Reduced Sulfur* (EPA approved 11/24/14).

Appendix B - QA Requirements for PSD Monitors: Not applicable. This will not be a PSD air monitoring site.

Appendix C – Ambient Air Quality Monitoring Methodology: The proposed site will utilize a continuous FEM SO_2 analyzer capable of taking 1-minute SO_2 readings.

Other equipment will include a data logger or computer capable of storing the 1-minute analyzer data; and two sets of calibration equipment (i.e., a calibrator, a zero air system and EPA-protocol SO_2 calibration gas). One set is for annual calibration and biweekly zero/span/precision checks and the other is for audits.

The make and model of the FEM analyzer, calibrator and zero air system have not been finalized. The FEM analyzer will be either purchased as a new unit or be no more than 5 years old. The calibrator and zero air system used will meet the specifications required for the FEM analyzer. All equipment will meet 40 CFR Part 58 Appendix C requirements.

Analytical equipment will be housed in a temperature-controlled enclosure that maintains interior temperatures between 20° to 30° C.

Appendix D – Network Design Criteria: Modeling was performed to identify the highest concentration area for the site. The proposed location meets the criteria for a microscale site as set forth in Appendix E Section 4.4.

Appendix E - Probe and Monitoring Path Siting Criteria: The preliminary site review sheet (below) demonstrates that the site will meet Appendix E requirements.

Nebraska NAMS/SLAMS Siting Criteria Review Sheet for Sulfur Dioxide

Pre-Siting Review for proposed SO_2 site at NPPD's Sheldon Station

Agency: Nebraska Department of Environmental Quality :

Location: 7475 Pershing Drive, Omaha, NE
Approximately 425 m SSE of the main entrance to the OPPD North Omaha Station main entrance and ~ 40 m east of Pershing Drive
Approximate Lat/Long 41º 19' 32" N and 95º 56' 46" W

AIRS Site ID: Proposed site - To be assigned (31-055-nnnn)

Date: November 10, 2016

Reviewer: Jim Yeggy

Monitoring Objective: Source-oriented | Scale: Micro-scale

40 CFR Part 58 Appendix E Criteria	Requirements	Review Comments
Section 2: Horizontal & vertical probe placement	2 to 15 m above ground	Analyzer will be housed within an enclosed trailer or dedicated enclosure structure. Inlet will be constructed to comply with inlet placement criteria. Anticipated inlet height ~3 m.
	At least 1 m from supporting structure	
	If on side of building, should be on side of prevailing winter wind	Not applicable.
Section 3: Spacing from minor sources	No furnace or other minor SO_2 sources nearby	OK. There is a railcar parking area ~ 15 m south of the site, but the locomotive engines used to park the cars maintain a distance of 1500 feet from the monitoring site.
Section 4: Spacing from obstructions	Distance from obstacle to probe at least 2x the obstacle height above the probe	OK. The North Omaha Station stacks range are 204 feet high, and are located 400 to 480 m north of the monitoring site. There are no obstructions between the stacks and the monitoring site.
	Exceptions for street canyon or building mounted inlets	Not applicable
Section 5: Spacing from trees	At least 10 m from tree drip-line	OK. The drip line of the closest tree is ~ 35 m WNW of the proposed site.
	Microscale sites: no trees between source and probe	OK. There are no trees between the stacks and proposed site. The closest tree is located 35 m WNW of the site, while the stacks are directly north.
Section 6: Spacing from Roadways	Not applicable to SO_2	Not applicable
General Comments: None		

NEBRASKA

DEPT. OF ENVIRONMENTAL QUALITY

Addendum to the 2016 Ambient Air Monitoring Network Plan
NDEQ Document # 16-020a

Date: November 17, 2016

Purpose: This addendum proposes to establish a new, source-oriented, ambient air monitoring site for SO2 at the OPPD ballpark on Pershing Drive in Omaha, NE.

Background: The Nebraska Department of Environmental Quality (NDEQ), in consultation with EPA Region 7, submitted on June 29, 2016, a proposal in the 2016 Ambient Air Monitoring Network Plan (Attachment F), to use the existing SO_2 site at 1616 Whitmore Street in Omaha, NE to meet the monitoring requirements of 40 CFR Part 51 Subpart BB (a.k.a. the Data Requirements Rule or DRR). Upon further review and consultation with EPA Region 7, the NDEQ now proposes to establish a new monitoring site to meet the DRR monitoring requirements. This new site is to be operational by 1/1/2017.

The existing SO_2 monitoring site at 1616 Whitmore will be retained, as proposed in the 2016 Ambient Air Monitoring Network Plan.

DRR Justification:
Emission Sources

The main major SO_2 emission sources in the vicinity of North Omaha Station are the Station itself, Eppley Airfield in Omaha, and Mid-American's Walter Scott Energy Center in Council Bluffs, IA. North Omaha Station has historically been a coal-fired electrical generating unit (EGU), and is capable of generating approximately 650 megawatts of electricity.

Based on annual Acid Rain Program data over the past 10 years, North Omaha Station's total SO_2 emissions (for Units 1 through 5) have ranged from approximately 10,500 tpy to 15,000 tpy with the average being approximately 13,000 tpy. For 2015, the total SO_2 emissions for all units were 13,892 tons. Figure Ad-1 shows these data, demonstrating an overall downward trend in SO_2 emissions.

Quarterly Acid Rain Program data from the past 10 years indicate that, in general with few exceptions, the highest SO_2 emissions from the facility occur during the 3rd quarter and sometimes 4th quarter. This is to be expected during the hottest months of the year due to increased demand on power stations for cooling needs. Figure Ad-2 demonstrates these trends.

In 2014, the OPPD board of directors approved a plan to retire three of the five coal-burning units at North Omaha Station, and to install emissions controls on the remaining two units which will be refueled in 2023 with natural gas. OPPD ceased coal operation of the first three coal-burning units in April 2016 (these units are still capable of firing natural gas); these three units accounted for approximately 47% of the facility's annual SO_2 emissions, on average, while burning coal.

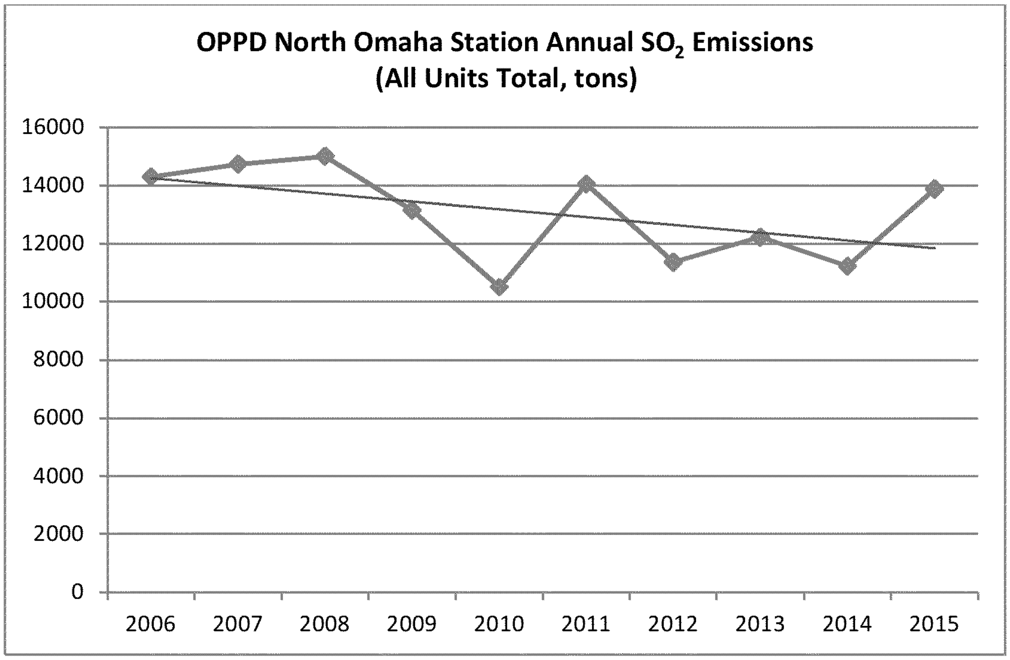


Figure Ad-1: OPPD North Omaha Station Annual SO_2 Emissions

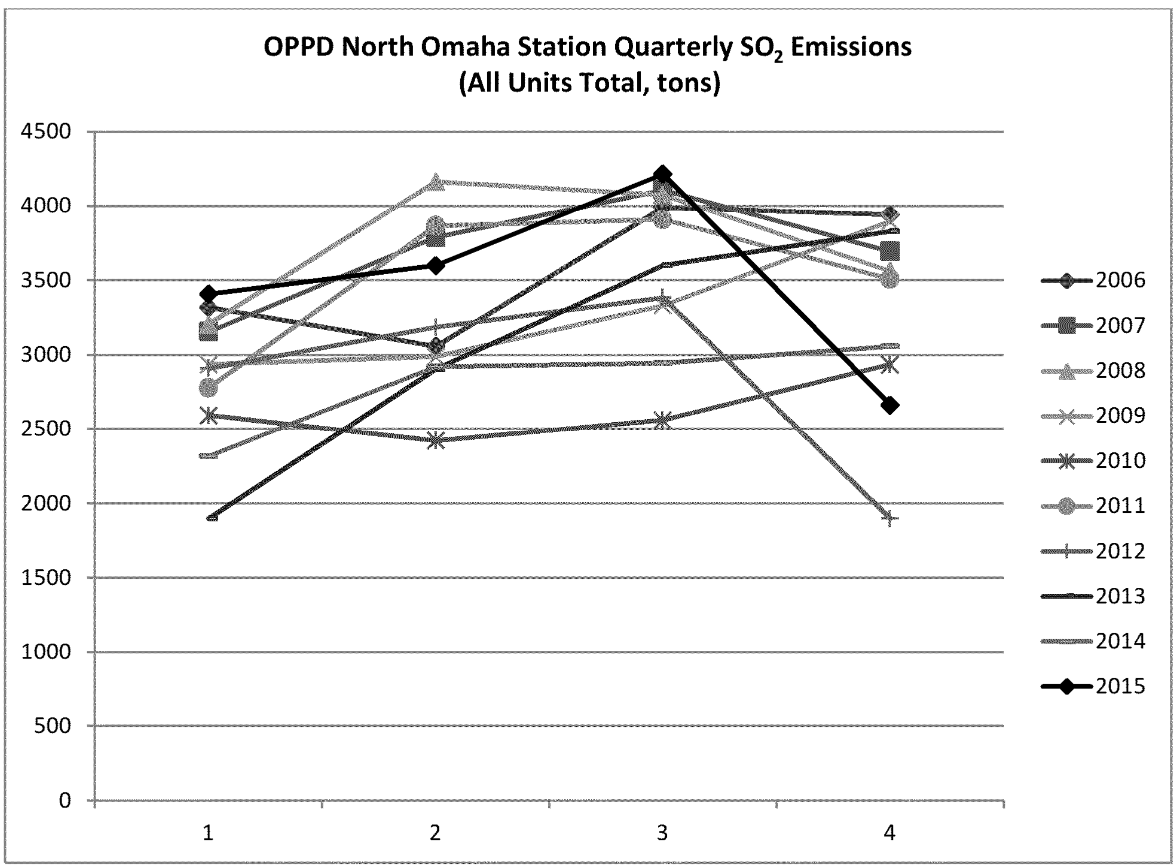


Figure Ad-2: OPPD North Omaha Station Quarterly SO_2 Emissions

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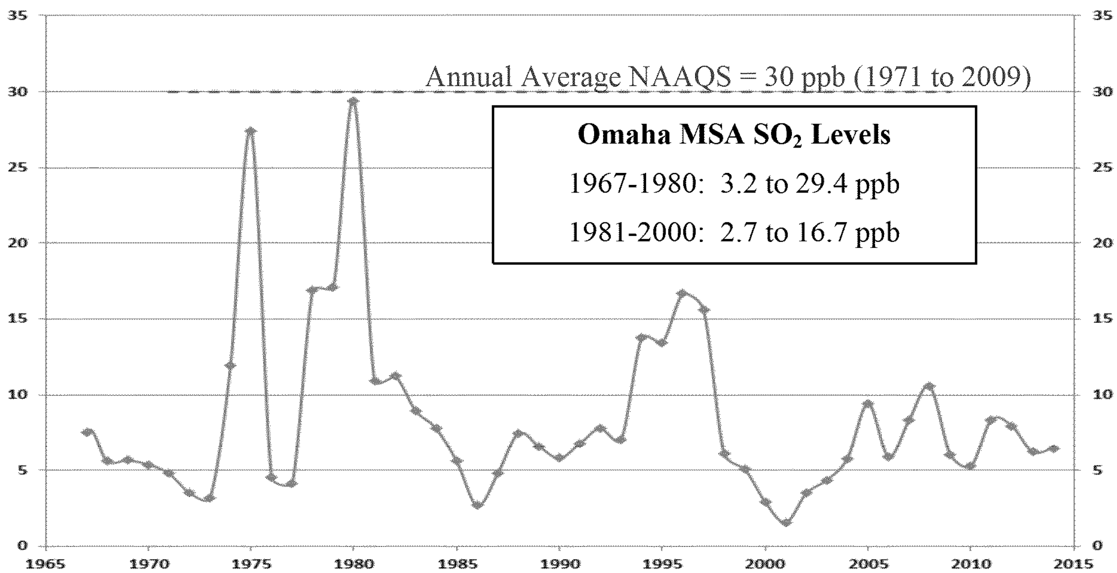

Figure Ad-3: Maximum Annual Average SO2 in Omaha MSA: 1967-2014

As demonstrated in Figure Ad-4, the Whitmore monitor has recorded an overall downward trend in annual 99th percentile SO_2 values since 2006, as well as declines in the three-year design values. No design values have exceeded the 2010 1-hour SO_2 NAAQS since 2009.

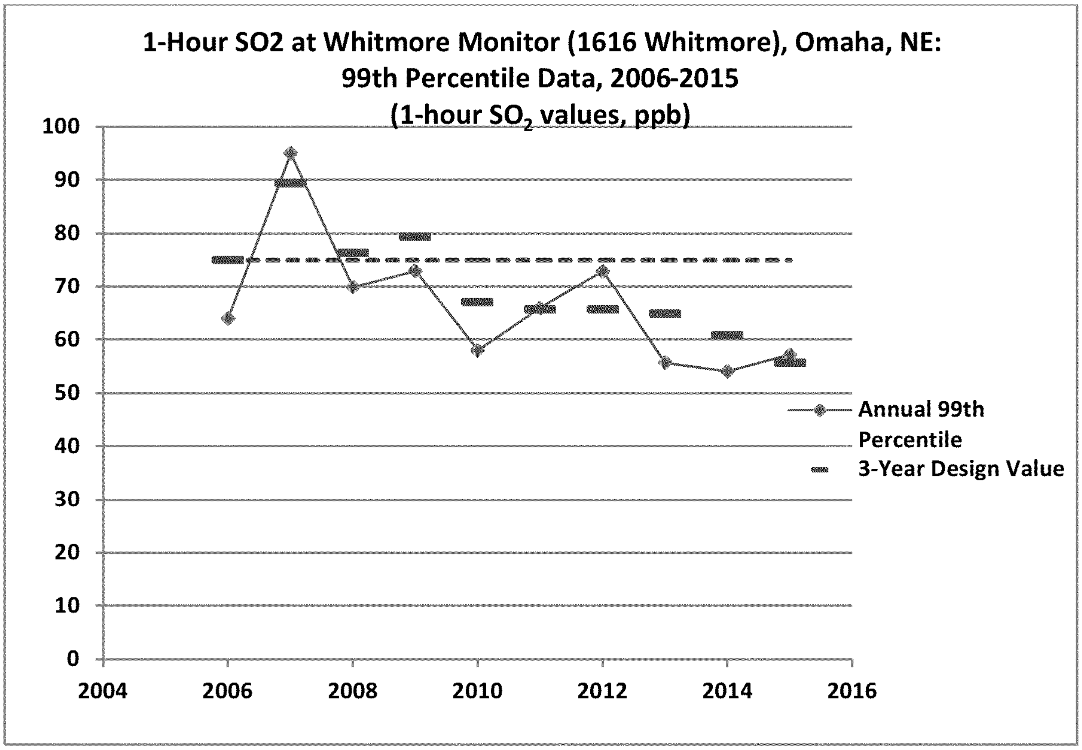

Figure Ad-4: 99th Percentile and Design Values of 1-hour SO_2 at Whitmore Monitor, 2006-2015

Modeling and Studies

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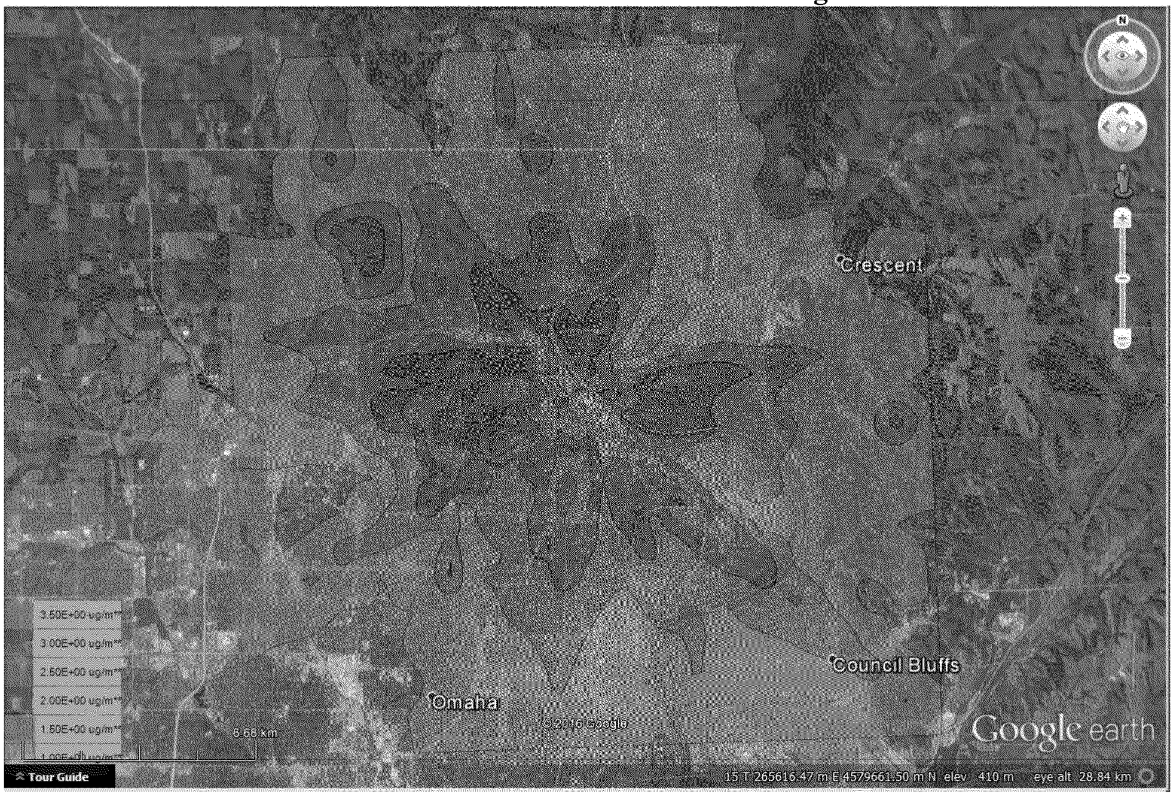

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250911.1 4578514.4	6	3.01916	47	182	229
253090.9 4579683.8	1	7.90919	174	54	228
247911.1 4581014.4	2	5.43359	116	110	226
252411.1 4578764.4	2	5.5969	116	106	222
253661.1 4578264.4	1	8.44074	174	46	220
252911.1 4580264.4	5	3.55149	53	167	220
251911.1 4580264.4	1	8.61063	174	45	219
251661.1 4581764.4	1	8.63094	174	44	218
249911.1 4584014.4	1	8.6461	174	43	217
251911.1 4578014.4	4	3.92929	65	150	215
254161.1 4580014.4	3	4.96206	89	125	214
251661.1 4578764.4	1	9.04993	174	36	210
253056 4580098.5	3	5.08667	89	121	210
253778 4579345.2	2	6.01046	116	93	209
251911.1 4577764.4	3	5.1654	89	119	208
250911.1 4586264.4	2	6.12349	116	90	206
250661.1 4582514.4	1	9.27907	174	31	205
250911.1 4583764.4	1	9.29149	174	30	204
252161.1 4578264.4	1	9.57256	174	28	202
253072.1 4579782	2	6.23888	116	85	201
253649.8 4579068.3	2	6.26343	116	84	200
249411.1 4582764.4	1	9.7304	174	25	199
253911.1 4578514.4	5	4.3059	53	146	199
248161.1 4580514.4	2	6.42779	116	81	197
253411.1 4578264.4	2	6.48141	116	80	196

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
252161.1 4577764.4	2	6.52924	116	79	195
253745.4 4579494.9	3	5.63415	89	105	194
252661.1 4579764.4	2	6.66788	116	74	190
248411.1 4582014.4	1	10.67337	174	15	189
253670.1 4579560.7	2	6.72931	116	71	187
253661.1 4579014.4	2	6.82083	116	69	185
253081.5 4579732.9	2	6.92502	116	67	183
253161.1 4578514.4	7	4.40795	37	143	180
253181.1 4579988.9	3	6.18878	89	87	176
253911.1 4578764.4	10	3.85841	22	154	176
253444.4 4579758.4	2	8.17908	116	49	165
253100.2 4579634.7	2	8.35747	116	48	164
248661.1 4582014.4	3	6.65851	89	75	164
249911.1 4585764.4	2	8.37373	116	47	163
253911.1 4580014.4	7	5.0618	37	124	161
250161.1 4579264.4	2	8.92528	116	40	156
252911.1 4579514.4	2	8.93183	116	39	155
251161.1 4578514.4	3	7.1286	89	66	155
250161.1 4585014.4	2	9.00141	116	37	153
252661.1 4579014.4	3	7.20133	89	64	153
253557.3 4579659.5	3	7.55158	89	61	150
253661.1 4580014.4	6	5.67643	47	103	150
253411.1 4580514.4	4	6.28314	65	83	148
253411.1 4578514.4	3	7.82657	89	56	145
253661.1 4580514.4	6	5.84887	47	98	145
250161.1 4583014.4	2	9.67187	116	26	142

Addendum to the 2016 Ambient Air Monitoring Network Plan

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
253594.9 4579626.6	4	6.63399	65	76	141
250411.1 4581764.4	2	9.85925	116	24	140
253911.1 4580264.4	7	5.74945	37	100	137
253248.1 4579237	4	6.79289	65	70	135
253692.4 4579094.4	7	5.85256	37	97	134
253109.6 4579585.5	3	8.65345	89	42	131
253283.4 4579201.5	4	7.14351	65	65	130
252411.1 4579514.4	4	7.93854	65	53	118
252911.1 4579014.4	5	7.30569	53	63	116
253119 4579536.4	4	8.14088	65	50	115
253353.8 4579130.6	5	7.71737	53	58	111
252911.1 4579264.4	5	7.90059	53	55	108
250411.1 4582014.4	3	10.74439	89	14	103
249911.1 4583014.4	4	9.10055	65	33	98
253256.3 4579923.1	7	8.04318	37	52	89
253389.1 4579095.1	4	9.94604	65	20	85
253411.1 4580014.4	5	9.15268	53	32	85
251411.1 4581764.4	4	10.4599	65	17	82
253218.7 4579956	10	7.55485	22	60	82
253161.1 4580264.4	16	6.68595	8	72	80
251411.1 4580264.4	4	10.9018	65	13	78
253607.2 4579042.2	7	8.78206	37	41	78
251661.1 4582014.4	4	11.57316	65	11	76
253409.2 4579074.8	4	11.61527	65	10	75
253632.5 4579593.7	6	9.64629	47	27	74
253430.4	4	13.01129	65	6	71

Table Ad-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station. The lowest total scores represent the highest ranked receptor locations.

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
4579071.8					
253406.8 4579791.3	6	10.45729	47	18	65
253161.1 4580514.4	20	7.55502	5	59	64
253411.1 4579014.4	5	11.80037	53	9	62
251911.1 4580514.4	5	11.94383	53	8	61
253661.1 4580264.4	24	7.73063	3	57	60
253411.1 4578764.4	7	9.92953	37	21	58
253519.7 4579692.5	10	9.07595	22	34	56
253661.1 4578514.4	11	8.97698	18	38	56
253411.1 4580264.4	37	8.11045	1	51	52
253661.1 4578764.4	17	9.06968	7	35	42
253294 4579890.1	10	10.13393	22	19	41
252661.1 4579514.4	11	9.90786	18	22	40
253161.1 4578764.4	15	9.4022	10	29	39
253494.8 4578973.3	8	13.9279	33	3	36
253431.9 4579071.6	9	13.20433	29	5	34
253485 4578988.7	9	14.03447	29	2	31
253161.1 4579014.4	16	9.86968	8	23	31
253564.5 4579016	10	12.36971	22	7	29
253331.6 4579857.2	15	10.669	10	16	26
253458 4579030.8	10	14.25943	22	1	23
253369.2 4579824.2	21	11.51426	4	12	16
253521.9 4578989.9	19	13.32461	6	4	10

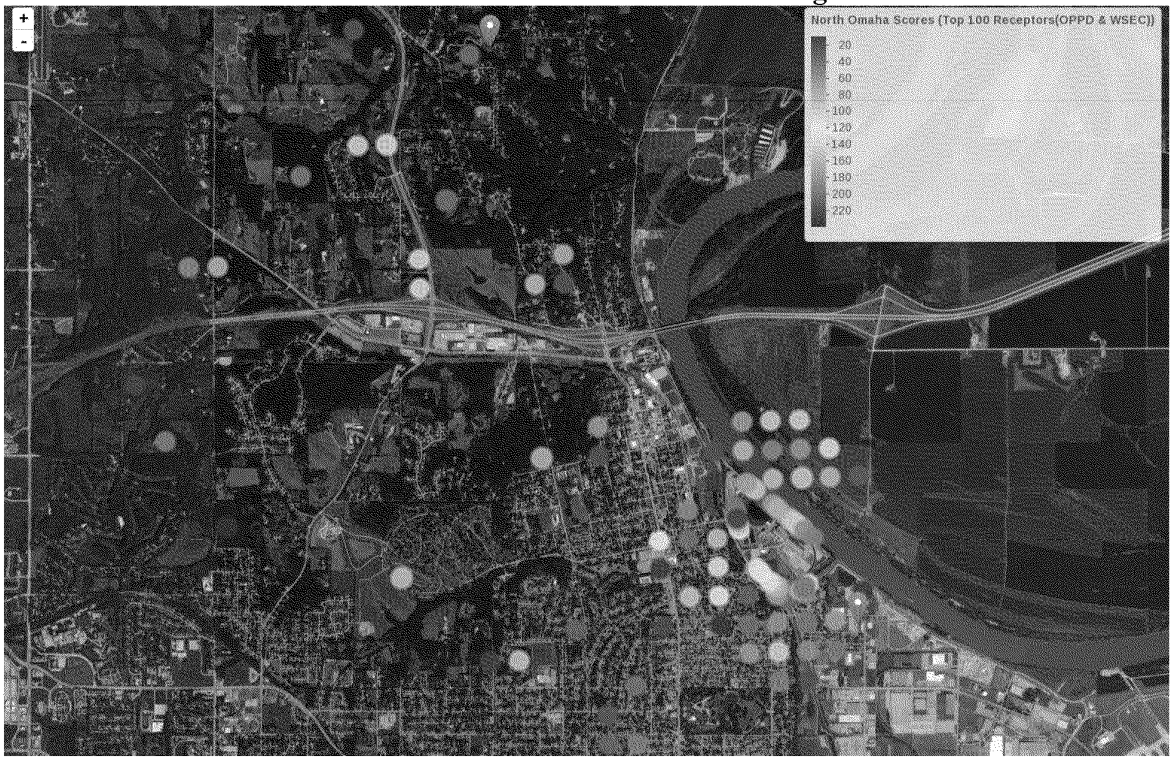


Figure Ad-6: Top 100 Receptor Locations Surrounding North Omaha Station. The lowest total scores (red dots) represent the top ranked receptor locations.

As Figure Ad-6 demonstrates, the cluster of highest-ranked receptors not in the Missouri River or along its banks (and therefore in danger of flooding) appear south of North Omaha Station. The proposed monitoring location is in this area.

Meteorological Data

As shown in Figure Ad-7, wind roses from the nearest meteorological stations (OMA and CBF) indicate general prevalent wind direction in the area as NW/NNW or S/SSE.

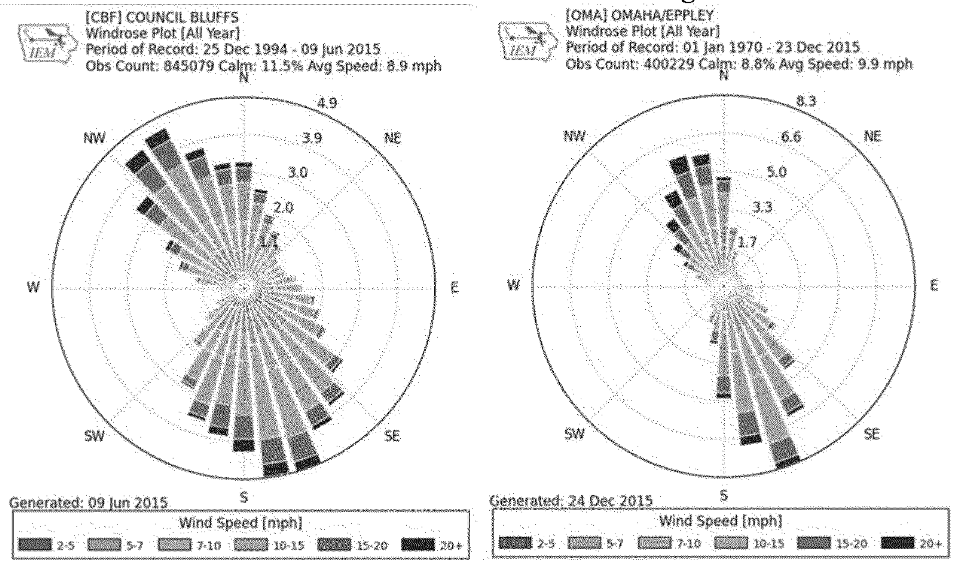


Figure Ad-7: Omaha Area Wind Roses

Geographic Influences

As indicated in Figure Ad-6, much of the area south of OPPD's North Omaha Station consists of metropolitan development, while much of the area north and west of North Omaha Station is wooded or farmland. It should be noted that an SO_2 monitor was previously placed in the wooded area north of North Omaha Station, but was decommissioned in 2010 due to consistently low recordings; it is likely that this monitor was impacted by tree canopy.

Site Determination

Through the additional modeling conducted by NDEQ and EPA Region 7 staff, NDEQ was able to narrow down a proposed site location. Installation of a monitor in or along the Missouri River would be infeasible, as would installation of a monitor within residential neighborhoods or in wooded areas. The remaining most feasible location is in the vicinity of the ballfields/parking area immediately south of the power plant, along John J. Pershing Drive. This is the proposed monitoring location (Figure Ad-8).

Figure Ad-8: Proposed DRR Monitoring Location for North Omaha Station

EPA Region 7 staff visited the site on November 9, 2016 and confirmed there were no concerns with the location in terms of interference from the roadway or rail line, and that it was appropriately placed to monitor the most feasible area of highest impact as indicated by the cluster of receptors as shown in Figure Ad-6.

The proposed site is fairly level with no trees or other major concerns for placement of the monitor and supporting equipment. Figure Ad-9 provides photos of the proposed site and its surroundings.

Figure Ad-9: Photos of Proposed DRR Monitoring Location for North Omaha Station

1. From proposed site, looking north toward North Omaha Station

2. From proposed site, looking east

Figure Ad-9 (cont'd): Photos of Proposed DRR Monitoring Location for North Omaha Station

3. From proposed site, looking south toward John J. Pershing Drive

4. From proposed site, looking west

Because the existing Whitmore monitoring site was placed specifically to capture SO_2 readings from North Omaha Station in an economically disadvantaged area for environmental justice purposes, the NDEQ feels that Whitmore and this single additional proposed monitoring location will satisfy DRR needs. Further, given the expected drastic reduction and possible near-elimination of SO_2 emissions from this facility (given halted operation with coal of Units 1-3 and impending conversion of Units 4 and 5 to natural gas in the coming years), NDEQ feels that additional investment in installing monitors for this source would be an unwise expenditure of limited funding and resources.

NDEQ will provide a trailer to house the monitor and supporting equipment, while the Douglas County Health Department will provide the monitor and supporting equipment. OPPD will provide electricity and fencing around the trailer. Douglas County Health Department will operate the monitor.

Proposed SO_2 Monitoring Site: Additional Information and Part 58 Compliance Review

The proposed SO_2 monitoring location is to be a micro-scale, source-oriented site with respect to OPPD's North Omaha Station, a coal-fired electrical generating unit in Omaha, NE. The site is on the south end of the North Omaha Station property and adjacent to a public parking area associated with ball fields at that location. The approximate Lat/Long coordinates are 41° 19' 32" N and 95° 56' 46" W. The site is ~40 m east of Pershing Drive and 15 m north of a rail car parking area. The location of the proposed site is shown in Figure Ad-8. Also see photos of site location in Figure Ad-9.

The proposed site will meet applicable requirements of 40 CFR Part 58. A compliance review with respect to Part 58 Appendixes A thru E is provided below.

Appendix A - QA Requirements for Monitors used for NAAQS Evaluations: The Douglas County Health Department (DCHD) will operate the site. DCHD has experience operating SO_2 sites and meeting Appendix A QA requirements. Operating, maintenance and QA requirements will comply with the requirements of the *Quality Assurance Project Plan (QAPP)for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation and Total Reduced Sulfur* (EPA approved 11/24/14).

Appendix B - QA Requirements for PSD Monitors: Not applicable. This will not be a PSD air monitoring site.

Appendix C – Ambient Air Quality Monitoring Methodology: The proposed site will utilize a continuous FEM SO_2 analyzer capable of taking 1-minute SO_2 readings.

Other equipment will include a data logger or computer capable of storing the 1-minute analyzer data; and two sets of calibration equipment (i.e., a calibrator, a zero air system and EPA-protocol SO_2 calibration gas). One set is for annual calibration and biweekly zero/span/precision checks and the other is for audits.

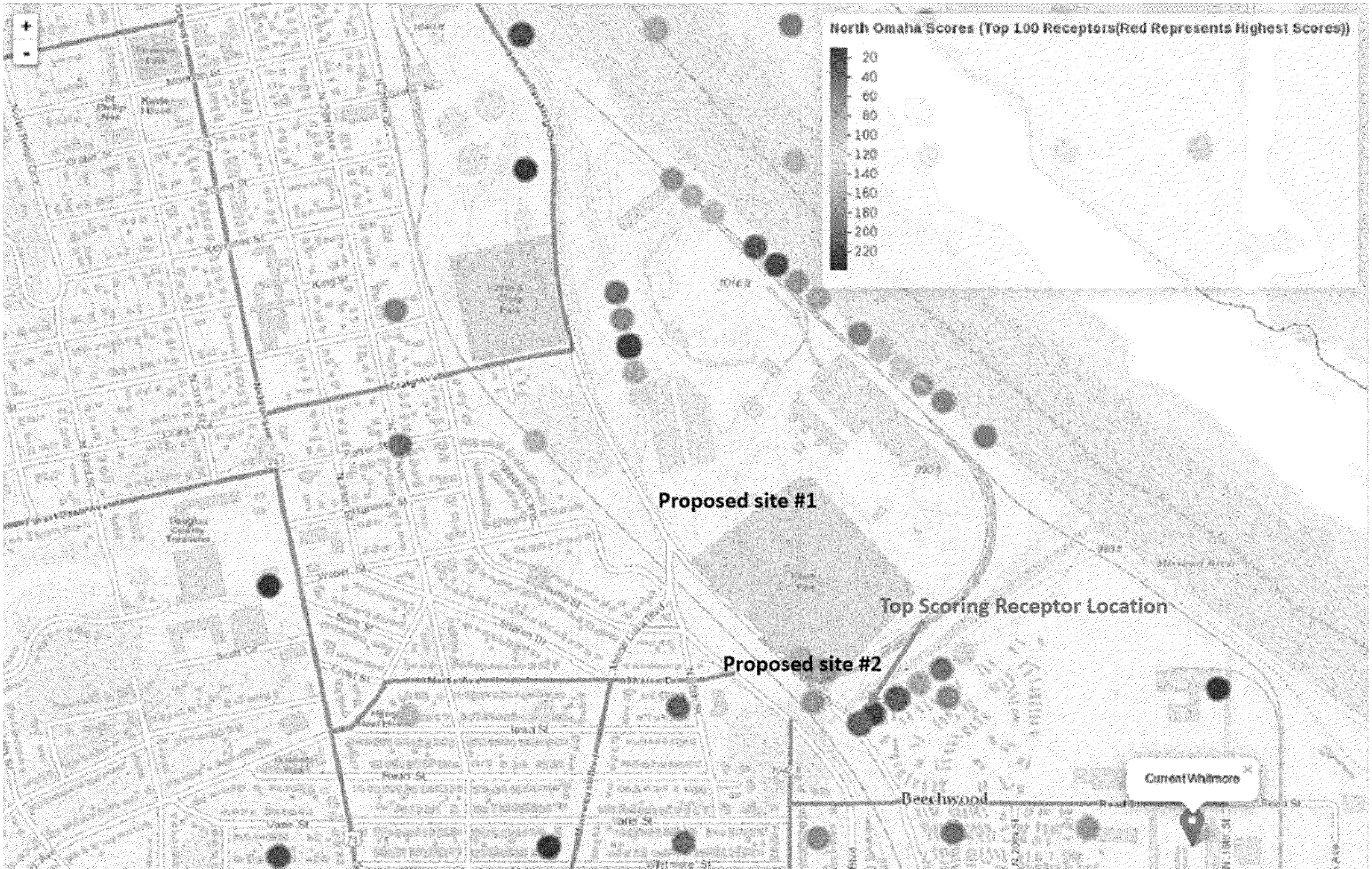
The make and model of the FEM analyzer, calibrator and zero air system have not been finalized. The FEM analyzer will be either purchased as a new unit or be no more than 5 years old. The calibrator and zero air system used will meet the specifications required for the FEM analyzer. All equipment will meet 40 CFR Part 58 Appendix C requirements.

Analytical equipment will be housed in a temperature-controlled enclosure that maintains interior temperatures between 20° to 30° C.

Appendix D – Network Design Criteria: Modeling was performed to identify the highest concentration area for the site. The proposed location meets the criteria for a microscale site as set forth in Appendix E Section 4.4.

Appendix E - Probe and Monitoring Path Siting Criteria: The preliminary site review sheet (below) demonstrates that the site will meet Appendix E requirements.

Nebraska NAMS/SLAMS Siting Criteria Review Sheet for Sulfur Dioxide		
Pre-Siting Review for proposed SO_2 site at NPPD's Sheldon Station Agency: Nebraska Department of Environmental Quality : Location: 7475 Pershing Drive, Omaha, NE Approximately 425 m SSE of the main entrance to the OPPD Nor th Omaha Station main entrance and ~ 40 m east of Pershing Drive Approximate Lat/Long 41° 19' 32" N and 95° 56' 46" W AIRS Site ID: Proposed site - To be assigned (31-055-nnnn) Date: November 10, 2016 Reviewer: Jim Yeggy		
Monitoring Objective: Source-oriented		Scale: Micro-scale
40 CFR Part 58 Appendix E Criteria	**Requirements**	**Review Comments**
Section 2: Horizontal & vertical probe placement	2 to 15 m above ground	Analyzer will be housed within an enclosed trailer or dedicated enclosure structure. Inlet will be constructed to comply with inlet placement criteria . Anticipated inlet height ~3 m.
	At least 1 m from supporting structure	
	If on side of building, should be on side of prevailing winter wind	Not applicable.
Section 3: Spacing from minor sources	No furnace or other minor SO_2 sources nearby	OK. There is a railcar parking area ~ 15 m south of the site, but the locomotive engines used to park the cars maintain a distance of 1500 feet from the monitoring site.
Section 4: Spacing from obstructions	Distance from obstacle to probe at least 2x the obstacle height above the probe	OK. The North Omaha Station stacks range are 204 feet high , and are located 400 to 480 m north of the monitoring site. There are no obstructions between the stacks and the monitoring site.
	Exceptions for street canyon or building mounted inlets	Not applicable
Section 5: Spacing from trees	At least 10 m from tree drip - line	OK. The drip line of the closest tree is ~ 35 m WNW of the proposed site.
	Microscale sites: no trees between source and probe	OK. The re are no trees between the stacks and proposed site . The closest tree is located 35 m WNW of the site , while the stacks are directly north.
Section 6: Spacing from Roadways	Not applicable to SO_2	Not applicable
General Comments: None		


North Omaha Scores (Top 100 Receptors(Red Represents Highest Scores))
20
40
60
80
100
120
140
160
180
200
220
Proposed site #1
Proposed site #2
Top Scoring Receptor Location
Current Whitmore
Power Park
28th & Craig Park
Florence Park
Douglas County Treasurer
Graham Park
Missouri River
Beechwood
Craig Ave
Read St
Vane St
Whitmore St
Iowa St
Martin Ave
Sharon Dr
Weber St
Scott St
Ernst St
Scott Cir
Potter St
King St
Reynolds St
Young St
Grebe St
Mormon St
N 30th St
N 24th St
N 20th St
N 16th St
1040 ft
1016 ft
990 ft
989 ft
1042 ft

Attachment 1

Table of Sources Affected by DRR and Method of Air Quality Characterization

FID	Plant Name	Method of Air Quality Characterization		Federally enforceable requirement to limit SO_2 emissions to under 2,000 tpy	Description
		Monitoring	Modeling		
071-0003	AMEREN MISSOURI-LABADIE ENERGY CENTER	X			
143-0004	NEW MADRID POWER PLANT-MARSTON	X			
175-0001	THOMAS HILL ENERGY CENTER POWER DIVISION-THOMAS HILL		X		
189-0010	AMEREN MISSOURI-MERAMEC ENERGY CENTER		X		
083-0001	KANSAS CITY POWER AND LIGHT CO (KCP AND L)-MONTROSE GENERATING STATION		X		
201-0017	SIKESTON POWER STATION		X		
097-0001	EMPIRE DISTRICT ELECTRIC CO-ASBURY PLANT		X		
143-0008	NORANDA ALUMINUM INC-NEW MADRID	X			
019-0004	UNIVERSITY OF MISSOURI (MU)- COLUMBIA POWER PLANT			X	Facility-wide limit enforceable through Title V permit
095-0031	KCP AND L - GREATER MO OPERATIONS-SIBLEY GENERATING STATION		X		
186-0001	MISSISSIPPI LIME COMPANY-STE. GENEVIEVE			X	Facility-wide limit enforceable through Title V permit
077-0039	CITY UTILITIES OF SPRINGFIELD -JOHN TWITTY ENERGY CENTER		X		
510-0003	ANHEUSER-BUSCH INC-ST. LOUIS			X	Reduction of potential to emit through equipment shutdown or fuel switch. Post-2016 PTE less than 2,000 tons per year.
127-0001	BASF CORPORATION-HANNIBAL PLANT			X	Reduction of potential to emit through equipment shutdown or fuel switch. Post-2016 PTE less than 2,000 tons per year.
095-0050	INDEPENDENCE POWER AND LIGHT-BLUE VALLEY STATION			X	Reduction of potential to emit through equipment shutdown or fuel switch. Post-2016 PTE less than 2,000 tons per year.
093-0009	DOE RUN –BUICK RESOURCE RECYCLING FACILITY	X			

STATE OF MISSOURI

Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director

DEPARTMENT OF NATURAL RESOURCES

www.dnr.mo.gov

JUN 28 2016

Mr. Mark Hague
Regional Administrator
U.S. EPA, Region VII
11201 Renner Boulevard
Lenexa, KS 66219

Dear Mr. Hague:

The Missouri Department of Natural Resources' Air Pollution Control Program (air program) hereby submits this letter to provide the U.S. Environmental Protection Agency (EPA) with detailed evaluation specifics for sources subject to the requirements of the EPA Data Requirements Rule (DRR) for the 2010 1-hour Sulfur Dioxide (SO_2) National Ambient Air Quality Standard (NAAQS). The air program submitted the list of affected sources to the EPA on January 15, 2016. Per the DRR[1], the air program is required to notify EPA by July 1, 2016, of how the air quality around each identified source will be characterized: through new ambient air quality monitors, through air quality modeling, or through permanent and enforceable emission limitations of SO_2 to below 2,000 tons per year (tpy) by January 13, 2017. These evaluation methods will ultimately be used to determine each area's attainment status of the 2010 1-hour SO_2 NAAQS. The enclosed table (Attachment 1) details the air quality characterization method to be used for each affected source. For sources that will have federally enforceable emission limitations by January 13, 2017, the table provides a description of the requirements and intended emission limits.

To comply with 40 CFR §51.1203, this submittal also includes the following required information:

1) *Modeling Protocol for Characterization of Air Quality* for sources identified in the table that will characterize SO_2 concentrations through air quality modeling (Attachment 2), and
2) Missouri's *2016 Monitoring Network Plan* for sources identified in the table that will characterize SO_2 concentrations through ambient air quality monitoring (Attachment 3). Please note the attached monitoring network plan is the public inspection version. The final monitoring network plan will be posted on our webpage here: http://dnr.mo.gov/env/apcp/docs/2016monitoringnetworkplan.pdf

[1] 40 CFR 51.1203, Final Data Requirements Rule for the 2010 1-hour Sulfur Dioxide Primary National Ambient Air Quality Standard, published in Federal Register on August 21, 2015.

Thank you for your attention to this matter. If you have any questions regarding this submittal, please contact Ms. Darcy Bybee with the Missouri Department of Natural Resources' Air Pollution Control Program at P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kyra L Moore

Kyra L. Moore
Director

KLM:clc

Enclosures:
Attachment 1: Table of Sources Affected by DRR and Method of Air Quality Characterization
Attachment 2: Modeling Protocol for Characterization of Air Quality
Attachment 3: Missouri's 2016 Monitoring Network Plan

c: Missouri Air Conservation Commission
File# 2010-SO2-5-DRR

EPA Quarterly Meeting (April 2016)

Possible topics

Update on Carthage actions

Status of KCPL Lake Road agreement and SIP revision

Status of CU agreement and SIP revision?

Status of SO2:

initial round NAAs – redesignation of Jefferson County

CD round – 120-day letter response, timing of upcoming EPA actions

DRR modeling round – required permitting actions for sources taking limit

DRR monitoring round – Any updates from EPA? Buick and Noranda monitoring

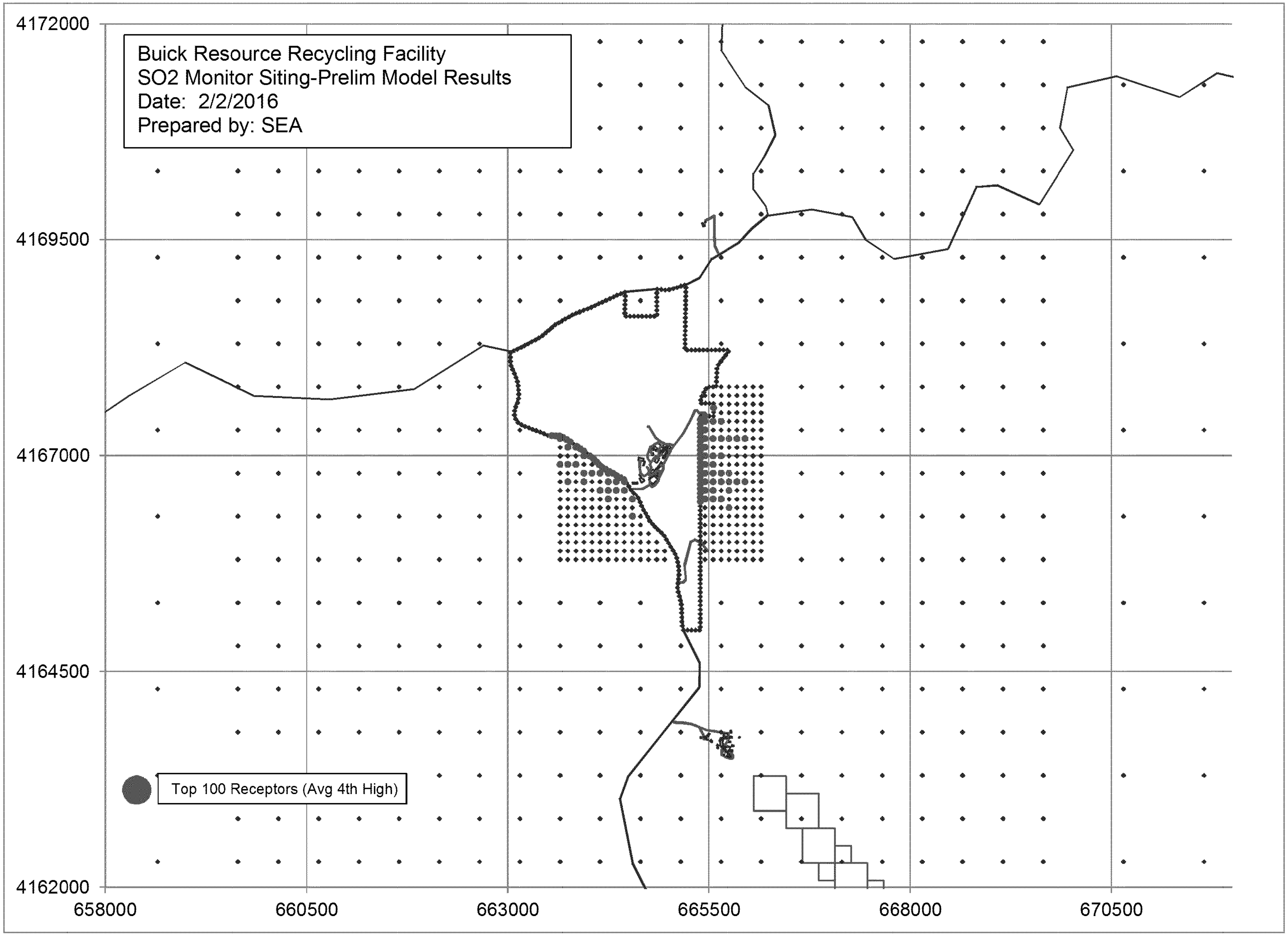
Status of Ozone:

2008 standard – timing of and any comments on redesignation request and maintenance plan.

2015 standard – timing of boundary recommendations

Regional Haze: any updates from EPA? When will EPA finalize approval for the 5-yr progress report? Prong 4 approvals?

SIP approval schedule


Buick Resource Recycling Facility
SO2 Monitor Siting-Prelim Model Results
Date: 2/2/2016
Prepared by: SEA
Top 100 Receptors (Avg 4th High)
4172000
4169500
4167000
4164500
4162000
658000
660500
663000
665500
668000
670500

From: Casburn, Tracey
Location: R7-RO2.3-L08-12/R7-RO; R7-Confline Ex. 6 - Personal Privacy P10XXXX/Phone/R7-RO
Importance: Normal
Subject: Talk about path forward for SO2 DRR modeling submitted based on 2015 CEMS data
Start Date/Time: Tue 1/10/2017 8:30:00 PM
End Date/Time: Tue 1/10/2017 9:30:00 PM

To: Alam, Lisa[lisa.alam@nebraska.gov]
Sent: Fri 3/24/2017 5:18:04 PM
Subject: RE: 1-hr SO2 modeling domain for Whelan

Hi Lisa,

I

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, March 22, 2017 1:55 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-hr SO2 modeling domain for Whelan

Lance:

OK fine.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 1:00 PM
To: Alam, Lisa
Subject: RE: 1-hr SO2 modeling domain for Whelan

Not at this point…just seeing maybe if HDR had a modeling run with results with an slightly expanded grid easily available. So if re-modeling out to 10-km (and I do believe the modeling will be ok out to 10-km) is a heavy lift, lets hold off.

Thanks

Lance

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, March 22, 2017 12:51 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-hr SO2 modeling domain for Whelan

Good point. Do you believe the model needs to be re-run, with an increased receptor grid?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 12:45 PM
To: Alam, Lisa
Subject: RE: 1-hr SO2 modeling domain for Whelan

Hi Lisa,

I agree on PGS impacts and the distance from Whelan, so lets not worry about PGS. I guess what would be nice is if the domain went out to 10-km around Whelan, as you can see the AGP facility is about 1-km from the domain edge, and cumulative impacts from Whelan and AGP might extend beyond the current grid. So if we could verify the modeling looks ok out to 10 km around Whelan, that would be encouraging.

Please let me know of any more questions,

Thanks much,

Lance

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, March 22, 2017 12:38 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-hr SO2 modeling domain for Whelan

Lance:

HDR did not send the receptor grid for Whelan that they proposed in the protocol. In the protocol, the receptor grid extended 30 km north from Whelan, to include PGS in Whelan's SO2 SIP model. I was attempting to coax HDR to model as many 1-hour SO2 "SIP facilities" as possible in a single SIP model, and that is why I included PGS in Whelan's modeling as a nearby, in case PGS might later be identified as a "Round 3" SIP modeling objective.

PGS is over 30 km away from Whelan, and putting receptors out to 30 km in Whelan's model is a little excessive.

If PGS is required to model 1-hour SO2, Whelan's model can't be used to say PGS will not violated the NAAQS, which is disappointing, but I will learn to live with that.

Focusing only on Whelan, it's a solid modeling demonstration, and at 30 km away, PGS will not cause a significant impact gradient with Whelan's predicted impacts.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

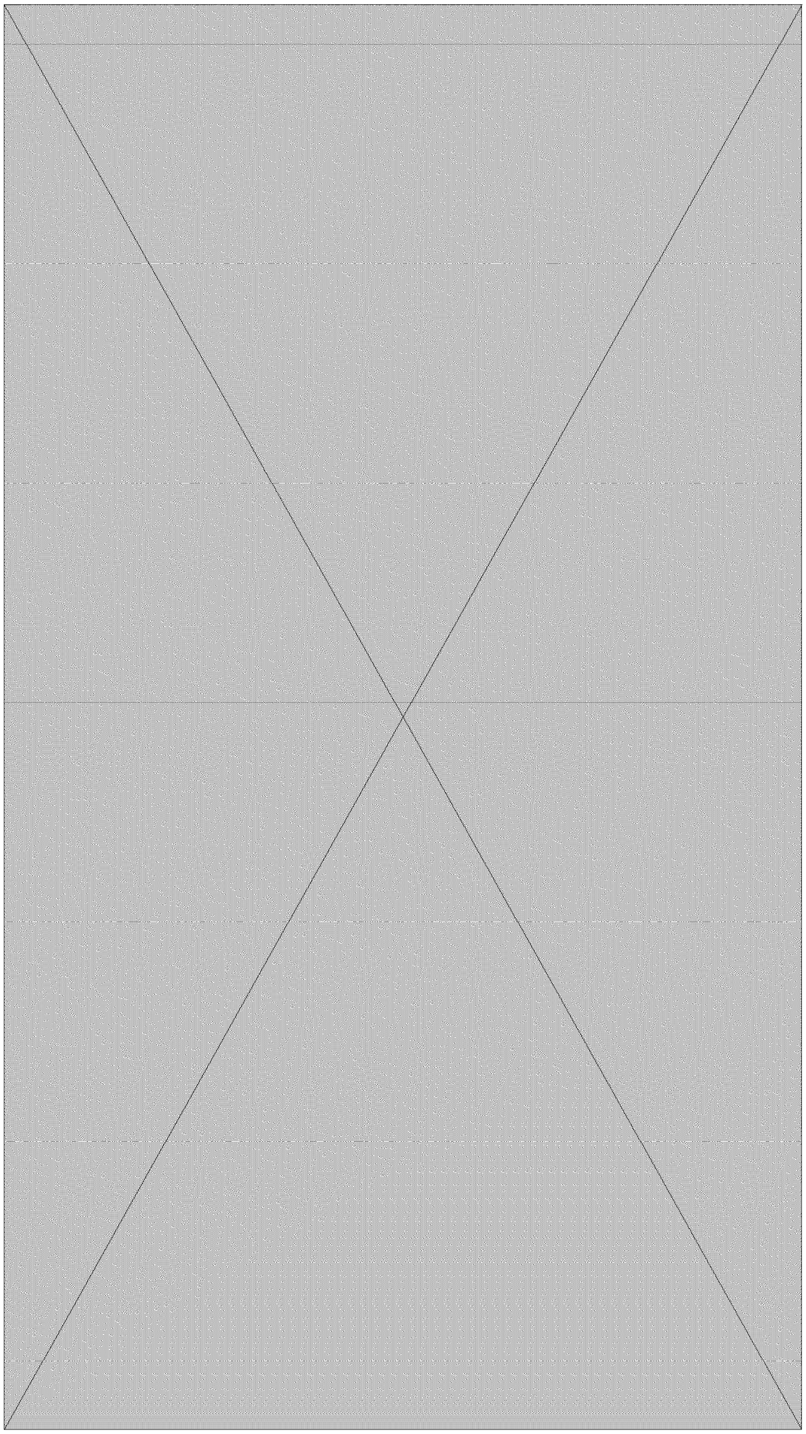
(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 10:21 AM
To: Alam, Lisa
Cc: Wiese, Carrie
Subject: 1-hr SO2 modeling domain for Whelan

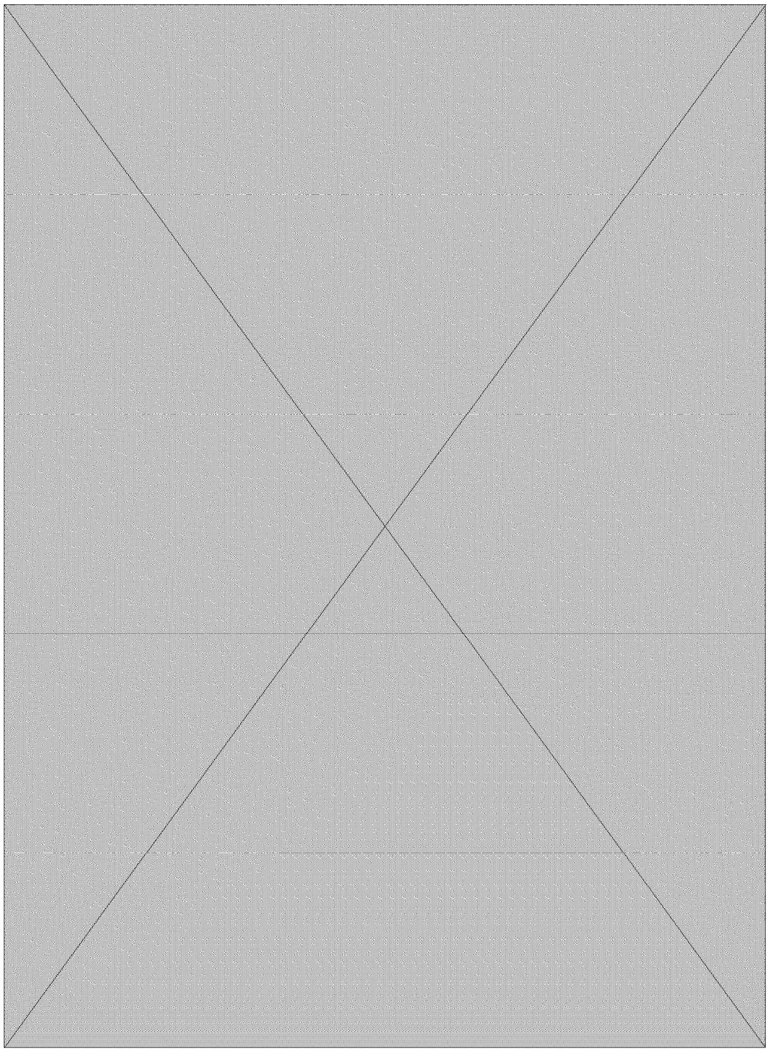
Hi Lisa,

Do you know if HDR provided modeling results for the entire modeling receptor grid for Whelan that they proposed in the protocol? You can see the receptor grid that was submitted in the January modeling demonstration is a subset of the proposed grid in the July protocol. It would be nice to verify that no modeling issues occurred beyond the small receptor grid (~5 km) provided in the January submitted demonstration:

Protocol receptor grid:



Submitted receptor grid:



Thanks!

Lance

To: Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; lisa.alam@nebraska.gov[lisa.alam@nebraska.gov]
Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]
Sent: Tue 10/18/2016 6:34:47 PM
Subject: RE: normalized SO2 modeling

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Krzak, Jennifer [DNR] [mailto:Jennifer.Krzak@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 12:32 PM
To: Avey, Lance <Avey.Lance@epa.gov>; brad.ashton@dnr.iowa.gov; lisa.alam@nebraska.gov
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

It is not the receptor elevations where we are seeing a difference, since we have not generated a 20 km receptor grid like that which has been created for OPPD we cannot compare those values. The point source elevations are where we initially saw a difference. The source locations are the same but our elevations range from about 2 to 4 meters higher, depending on whether it's a WSEC or OPPD source. We generally use NAD83.

Jennifer

JENNIFER KRZAK Environmental Specialist
Iowa Department of Natural Resources

P 515.725.9532 | F 515.725.9501 |jennifer.krzak@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Road, Suite 1 | Windsor Heights, IA 50324

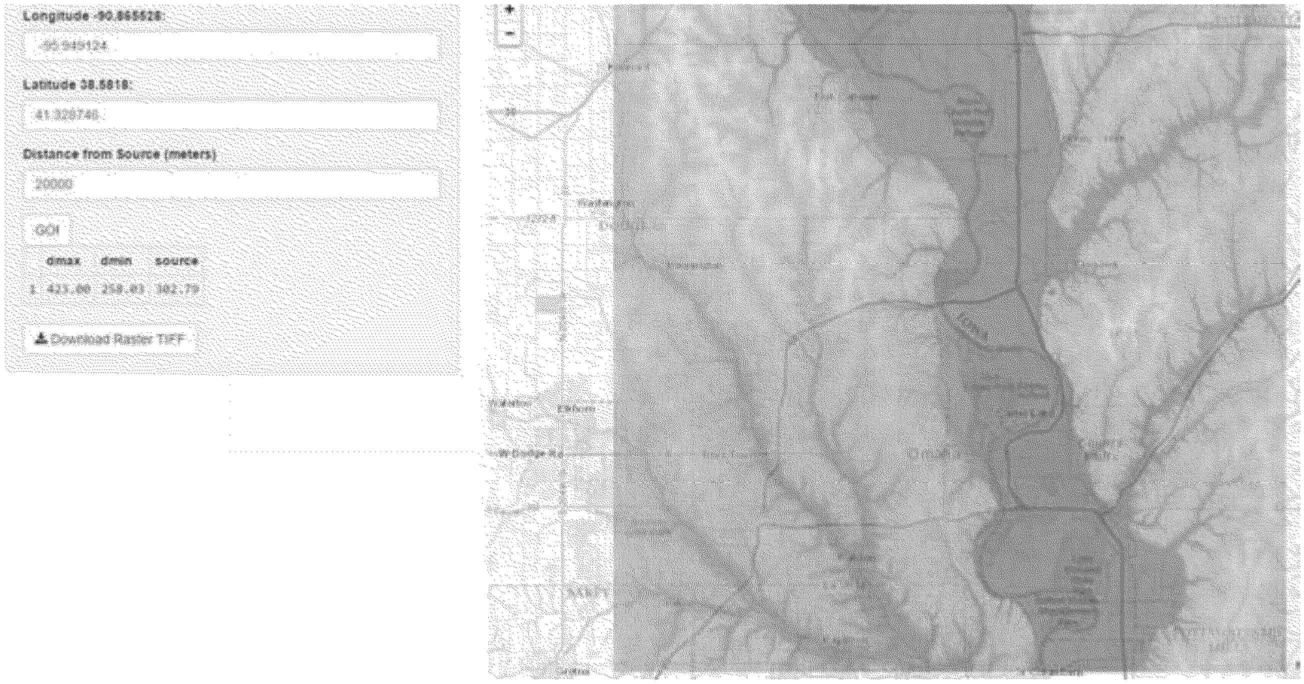
www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692
WWW.IOWADNR.GOV
Leading Iowans in Caring for Our Natural Resources.

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, October 18, 2016 11:34 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; lisa.alam@nebraska.gov
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Hi All,

Is it the receptor elevations that are different? If Lisa's and Brad's receptor locations differ, wouldn't the elevations potentially differ? p.s., I see Lisa just asked this question.

Pasted below is the 1 arc second NED file and the elevation within 20 km of OPPD. Also, on the left, it gives the maximum, minimum, and specific source elevation in meters. Does this look like the terrain file you all are using?



Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 10:52 AM
To: lisa.alam@nebraska.gov

Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: normalized SO2 modeling

Lisa,

The elevation data we used are also 1-arc second files. I'm not sure of the reason for this discrepancy. You might check your AERMAP files to confirm the correct datum is being used. Beyond that I'm not sure why we would be getting different elevations.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

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www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 10:31 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Mathew:

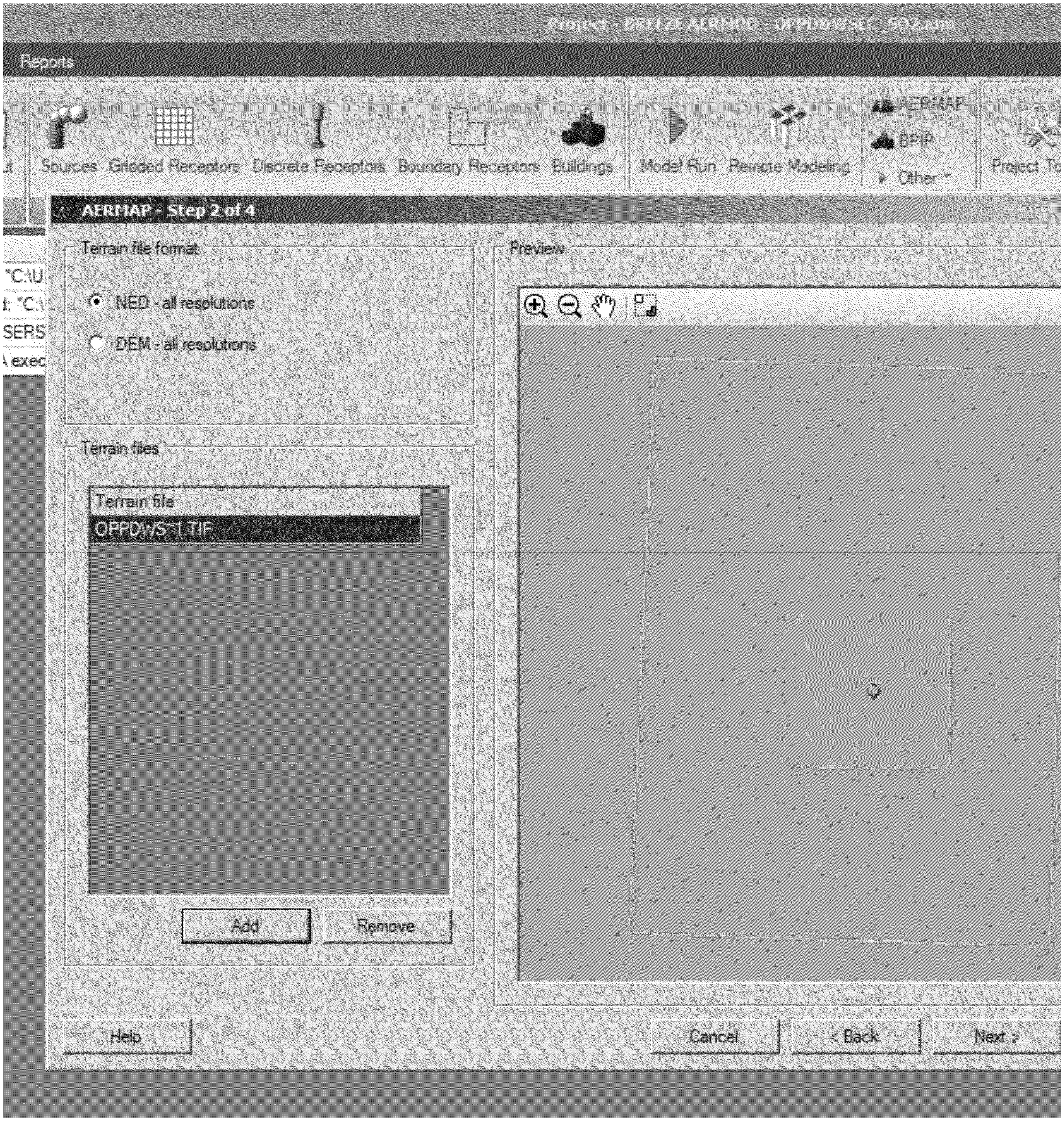
Thank you for your response.

You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

http://www.mrlc.gov/viewerjs/

I obtained a large elevation file to fit my receptor grid



Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Preview
Help
Cancel
< Back
Next >

using 1 arc second, datum WGS 84, and UTM zone 15, in a 100MB GeoTIFF file.

I did not break out receptors lying in zone 14, which begins ~ 6 km west of OPPD, in the City of Omaha.

I can rerun AERMAP – which will take some time as there are 11,435 receptors, so I'm hesitate to do that.

If Brad Ashton used 1/3 arc second, this might account for the differences in elevations.

Let me know what you think.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 9:29 AM
To: Alam, Lisa; Avey, Lance
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

It sounds like you understand our concerns, so we feel a call is no longer necessary. Unfortunately we don't have a receptor to grid that would suit your purposes, our grid is focused on Walter Scott.

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 9:05 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

Yes, that can work for but might be unnecessary.

Looking through the original emission files from OPPD, I do have emission rates that vary hourly for OPPD Units 4 & 5, but somehow when combining OPPD and WSEC in Excel to create a single hourly emission rate file, there appears to be an error. Thank you for pointing that out. I intend to rerun the OPPD model, combined with WSEC emissions today, correcting the emissions from OPPD.

As to the elevations, I could rerun AERMAP, but the results won't be any different. There are difficulties when as area is located in two Zones. I have rarely encounter this situation. I choose Zone 15, which is Iowa and part of Eastern Nebraska, including a large part of Douglas County. Do you have a problem with that approach? Do you want to send me your receptor grid?

Lance, do you have a problem with me using IDNR's receptor grid?

It' unlikely these changes will alter the results of the final product, but there's only one way to find out.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 8:36 AM
To: Alam, Lisa
Subject: RE: normalized SO2 modeling

Does this work for you Lisa?

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Tuesday, October 18, 2016 8:17 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Alam, Lisa <lisa.alam@nebraska.gov>
Cc: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

This Wednesday would be better for me; next Wednesday I will be out of the office.

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 7:34 AM
To: Wiese, Carrie; Alam, Lisa
Cc: Ashton, Brad [DNR]; Krzak, Jennifer [DNR]; McGraw, Jim [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

We'd like to have a call to discuss this further. Would any of these times work for you and Carrie?

Tomorrow (Wed 10/19) at 1 or 2 pm

Wed 10/26 at 2 pm?

Thank you,

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, October 17, 2016 4:28 PM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

That's a big difference. I ran AERMAP using an NED GeoTIFF elevation file downloaded from the USGS Website, **WGS 84, Zone 15**

I can send the *.tif file to you, although it's 100mb file. Some of the receptors are in Zone 14, but most of the receptors were in Zone 15, and I made a simplifying assumption that all were in Zone 15, but that would have effected only those receptors 6 to 7 km West of OPPD No Omaha.

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

I'm not certain I followed your comment #2, maybe it's just too late in the day.

- WSEC - each of the two emission units were normalized independently of each other (2013-15) using the largest emission rate from each emission unit, with a focus on modeling only the two largest emission units.

- OPPD provided the normalized emission rates to NDEQ, along with the varying temperature and velocity rates. They provided these values using their CEMs data, which might not match up exactly with the Air Markets Program Data. Initially, OPPD sent 2012-14 emission rates, and later sent 2015 emissions and parameters.

- I'm not aware of an additional hourly file, since I used only one hourly file in the AERMOD run. I believe you received your data package from Lance Avey at Region 7, and there may be some confusion that happen in the transfer of files. Let me speak to Lance tomorrow morning.

If you have any questions, comments, clarifications, feel free to give me a call.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

Hi Lisa,

Can you address Matthew's questions?

Thanks,

Carrie

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Monday, October 17, 2016 1:24 PM
To: Wiese, Carrie
Cc: McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]

Subject: normalized SO2 modeling

Hello Carrie,

We've reviewed the OPPD and Walter Scott normalized modeling analysis used to support the Nebraska SO2 monitor siting analyses (EPA sent us a copy). A couple of items caught our attention.

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

We'd be happy to discuss this further and to set up a call when you're ready.

Matthew

MATTHEW JOHNSON, Long Range Planning & Regional Modeling
Iowa Department of Natural Resources

P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692
WWW.IOWADNR.GOV
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To: Alam, Lisa[lisa.alam@nebraska.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]
Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]
Sent: Mon 8/8/2016 3:39:06 PM
Subject: RE: WSEC Data

Thanks Lisa,

And just to add, using actual velocities and temperatures would likely benefit the demonstration that the areas are "separate".

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, August 08, 2016 10:20 AM
To: brad.ashton@dnr.iowa.gov
Cc: Avey, Lance <Avey.Lance@epa.gov>; Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: WSEC Data

Brad:

Thank you for providing Walter Scott emissions data. The dataset includes SO2 emission (lb/hr), heat input (MMBtu), and gross load (MW) for Unit 3.

Question: How is stack gas exit temperature and velocity calculated from heat input and gross load for coal fired boilers?

OPPD North Omaha provided the Department with CEMs data that included

2013-15 hourly data, for both Units 4 and 5,

normalized actual emissions (g/s), and

velocity (m/s) and temperature (K).

It would be a more defensible analysis to use an apples to apples comparison in our effort to demonstrate OPPD and Walter Scott are in different areas whose impacts do not significantly overlap.

I'm certain we can find a solution to this difficulty and come up with the

same data years,

for all emission units with either actual normalized emissions or maximum potential normalized emissions, should be the same

including variable temperature, and velocities,

from both facilities to complete this analysis.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Friday, August 05, 2016 10:34 AM
To: Alam, Lisa
Cc: Zayudis, Peter [DNR]; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: RE: WSEC Data

Lisa,

After I sent this email to you we realized that the data may not be entirely useful to you because it only includes the CEMs data for Unit 3. MidAmerican used this data to represent the variability of both units 3 and 4, so we do not currently have CEM data for Unit 4.

We will contact MidAmerican and ask for the additional data that you need and request 2015 as well when we do so.

- Brad

From: Ashton, Brad [DNR]
Sent: Friday, August 05, 2016 10:26 AM
To: 'Alam, Lisa' <lisa.alam@nebraska.gov>
Cc: Zayudis, Peter [DNR] <Peter.Zayudis@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: WSEC Data

Lisa,

I have attached the data that we already have for Walter Scott. It is for 2012-2014 only, and only includes the hourly emission rates. This is all I can provide to you in the short term.

After you talk to Carrie about the additional data you will be obtaining from OPPD let me know if you will still need the 2015 data for WSEC.

- Brad

BRAD ASHTON, **Lead Worker – Dispersion Modeling**

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Tue 4/4/2017 6:09:49 PM
Subject: RE: Weather Data

Lance:

Good news about Whelan's timeline.

I believe Whelan's 1-Hour SO2 SIP model shouldn't have too many hiccups going forward, unless the increased emission rate shows a nonattainment.

I am sending Nucor 2008-12 Norfolk, NE met data, processed with

AERMET v 16216

AERSURFACE v 13016

AERMINUTE v 15272

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, April 04, 2017 12:14 PM
To: Alam, Lisa

Subject: RE: Weather Data

Thanks Lisa,

I have no objections with using the 2008-12 met data from Norfolk for Nucor PSD.

On Whelan, thanks to everyone for checking it out. For 1-hr SO2, the 120 day draft designations and TSDs are likely not going to out until July, 2017 sometime. So there is plenty of time to further check into the CEMS data. Hope this is not causing too much stress.

Lance

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, April 04, 2017 11:56 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Weather Data

Lance:

Norfolk, NE met data and Nucor's possible PSD CP

Yes – 2013 is the only affected year. A non-consecutive run is possible, however, to keep things simple, if Nucor is planning on a PSD project, I feel we should go with the 2008-12 met years, unless you have regulatory objections.

Whelan 1-hour SO2 SIP model

I've heard back from Ed Liebsch, HDR concerning the CAMD data and the discrepancy with the CEMs data Whelan supplied to HDR.

Whelan has told Ed this discrepancy is a mystery to them. They recall having have some flow monitoring issues, and they have contacted their contractor, Teledyne to look into this. Whelan is concerned about the timeline. Because of the time of year, (Emission Inventories, tax deadlines) Teledyne might not be able to get back to them before May 1st. Is there a critical timeline for this?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, April 04, 2017 11:27 AM
To: Alam, Lisa
Subject: RE: Weather Data

Hi Lisa,

Right, most important thing is to select the site that is most representative of the area of concern. And Norfolk, even with old met data, would be most representative for Nucor; so I would lean to using the 2008-12 data over recent data from distance NWS site that might not characterize the area as well as the Norfolk ASOS.

Lastly, is 2013 the only year with missing data? Could a 5-yr non-consecutive run potentially be performed? Like, a 2011-2012 run and then combined with a 2014-2016 run? Just a thought.

Thanks

Lance

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, April 04, 2017 8:29 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Weather Data

Lance:

I am being asked about most recent met data for the Norfolk, NE area (see below).

Attached is a Google Earth kmz file displaying ASOS met tower locations in Nebraska.

The met tower locations in red all have seven months of missing 2013 met data, IOW, incomplete records.

Normally, David is correct, the most recent met data is required in a PSD demonstration, but in this case,

using 2008-12 Norfolk met data is a better option than using 2012-16 met data from a met tower over

100km away.

Since this is possibly going to be a PSD demonstration at Nucor Steel, I want to know if you agree with me.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Graiver, David
Sent: Monday, April 03, 2017 8:03 AM
To: Srymanske, Roy H (NSNE)
Cc: Alam, Lisa; Wiese, Carrie
Subject: RE: Weather Data

Roy,

My understanding is that each PSD evaluation should utilize the most recent meteorological data available. Please contact our modeler, Lisa Alam. She can provide you with updated met data and can assist you with any other modeling questions or concerns.

Thanks!

-David Graiver

From: Srymanske, Roy H (NSNE) [mailto:Roy.Srymanske@nucor.com]
Sent: Friday, March 31, 2017 16:02
To: Graiver, David
Subject: Weather Data

David,

We are working on the submission for the NOx CO PSD we talked about Monday and for the modeling we need to know what kind of weather data you would like. Currently we have from 2008 through 2012. Should we get more recent data?

Thanks,

Roy

Roy Srymanske
Environmental Scientist
Nucor Steel Nebraska
2911 East Nucor Rd
Norfolk, NE 68701

402-644-0317

402-992-8709 (cell)

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Tue 4/4/2017 4:56:14 PM
Subject: RE: Weather Data

Lance:

Norfolk, NE met data and Nucor's possible PSD CP

Yes – 2013 is the only affected year. A non-consecutive run is possible, however, to keep things simple, if Nucor is planning on a PSD project, I feel we should go with the 2008-12 met years, unless you have regulatory objections.

Whelan 1-hour SO2 SIP model

I've heard back from Ed Liebsch, HDR concerning the CAMD data and the discrepancy with the CEMs data Whelan supplied to HDR.

Whelan has told Ed this discrepancy is a mystery to them. They recall having have some flow monitoring issues, and they have contacted their contractor, Teledyne to look into this. Whelan is concerned about the timeline. Because of the time of year, (Emission Inventories, tax deadlines) Teledyne might not be able to get back to them before May 1st. Is there a critical timeline for this?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]

Sent: Tuesday, April 04, 2017 11:27 AM
To: Alam, Lisa
Subject: RE: Weather Data

Hi Lisa,

Right, most important thing is to select the site that is most representative of the area of concern. And Norfolk, even with old met data, would be most representative for Nucor; so I would lean to using the 2008-12 data over recent data from distance NWS site that might not characterize the area as well as the Norfolk ASOS.

Lastly, is 2013 the only year with missing data? Could a 5-yr non-consecutive run potentially be performed? Like, a 2011-2012 run and then combined with a 2014-2016 run? Just a thought.

Thanks

Lance

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, April 04, 2017 8:29 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Weather Data

Lance:

I am being asked about most recent met data for the Norfolk, NE area (see below).

Attached is a Google Earth kmz file displaying ASOS met tower locations in Nebraska.

The met tower locations in red all have seven months of missing 2013 met data, IOW, incomplete records.

Normally, David is correct, the most recent met data is required in a PSD demonstration, but in this case,

using 2008-12 Norfolk met data is a better option than using 2012-16 met data from a met tower over

100km away.

Since this is possibly going to be a PSD demonstration at Nucor Steel, I want to know if you agree with me.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Graiver, David
Sent: Monday, April 03, 2017 8:03 AM
To: Srymanske, Roy H (NSNE)
Cc: Alam, Lisa; Wiese, Carrie
Subject: RE: Weather Data

Roy,

My understanding is that each PSD evaluation should utilize the most recent meteorological data available. Please contact our modeler, Lisa Alam. She can provide you with updated met data and can assist you with any other modeling questions or concerns.

Thanks!

-David Graiver

From: Srymanske, Roy H (NSNE) [mailto:Roy.Srymanske@nucor.com]
Sent: Friday, March 31, 2017 16:02
To: Graiver, David
Subject: Weather Data

David,

We are working on the submission for the NOx CO PSD we talked about Monday and for the modeling we need to know what kind of weather data you would like. Currently we have from 2008 through 2012. Should we get more recent data?

Thanks,

Roy

Roy Srymanske
Environmental Scientist
Nucor Steel Nebraska
2911 East Nucor Rd
Norfolk, NE 68701

402-644-0317

402-992-8709 (cell)

To: Avey, Lance[Avey.Lance@epa.gov]
Cc: Johnson, Matthew[matthew.johnson@dnr.iowa.gov]; Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]; Hamilton, Heather[Hamilton.Heather@epa.gov]; Mcgraw, Jim[jim.mcgraw@dnr.iowa.gov]; Peter Zayudis[peter.zayudis@dnr.iowa.gov]
From: Ashton, Brad
Sent: Tue 4/4/2017 12:34:34 PM
Subject: Re: Revised TSD - SO2 DRR/Designations

Lance,
The revised modeling files for the Cedar Rapids DRR are available here:

https://drive.google.com/drive/folders/0B7U4Xg1l0NzJZ2pha2RxRk14N3c?usp=sharing

- Brad

Brad Ashton | Lead Worker - Dispersion Modeling

Air Quality Bureau

Iowa Department of Natural Resources

P 515-725-9527 | 7900 Hickman Road - Suite 1 Windsor Heights, IA 50324

www.iowadnr.gov

On Mon, Apr 3, 2017 at 3:32 PM, Johnson, Matthew <matthew.johnson@dnr.iowa.gov> wrote:

Hello,

In response to a discussion initiated by EPA R7 the DNR is updating the technical support document (attached) for the data requirements rule/round 3 2010 1-hour SO2 designations. A new modeling analysis for Cedar Rapids has been conducted. The revised analysis utilizes maximum permitted allowable emission rates, instead of actuals, for SEP210 and SEP226 at ADM. In addition, the modeled emission rates for SEP087 and SEP089 at ADM have been updated to match their maximum permitted rates. The modeled results continue to support an “unclassifiable/attainment” designation. Finally, the DNR is providing supplemental information regarding the calculation of the emission rate for IPL's Prairie Creek Boiler #3. The aforementioned changes affect pages 8, 9, and 16 of the TSD.

Let us know if you have any questions,
Matthew

Matthew Johnson | Long Range Planning & Regional Modeling

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To: Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]; Hamilton, Heather[Hamilton.Heather@epa.gov]; Avey, Lance[Avey.Lance@epa.gov]
Cc: Mcgraw, Jim[jim.mcgraw@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Peter Zayudis[peter.zayudis@dnr.iowa.gov]
From: Johnson, Matthew
Sent: Mon 4/3/2017 8:32:15 PM
Subject: Revised TSD - SO2 DRR/Designations
TSD-round3DRRso2Designations-revisedFinal.pdf

Hello,

In response to a discussion initiated by EPA R7 the DNR is updating the technical support document (attached) for the data requirements rule/round 3 2010 1-hour SO2 designations. A new modeling analysis for Cedar Rapids has been conducted. The revised analysis utilizes maximum permitted allowable emission rates, instead of actuals, for SEP210 and SEP226 at ADM. In addition, the modeled emission rates for SEP087 and SEP089 at ADM have been updated to match their maximum permitted rates. The modeled results continue to support an "unclassifiable/attainment" designation. Finally, the DNR is providing supplemental information regarding the calculation of the emission rate for IPL's Prairie Creek Boiler #3. The aforementioned changes affect pages 8, 9, and 16 of the TSD.

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2010 1-Hour Sulfur Dioxide (SO_2) Standard

Round 3 Designation Recommendations and Data Requirements Rule

Technical Support Document

Iowa Department of Natural Resources
Environmental Services Division

Air Quality Bureau
7900 Hickman Rd, Ste 1
Windsor Heights, IA 50324

December 19, 2016
(revised 4/3/2017)

Executive Summary

The State of Iowa is providing the U.S. Environmental Protection Agency (EPA) with updated recommendations for the third round of designations for the 2010 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS). The State recommends each county in Iowa and the portion of Muscatine County currently undesignated for the 2010 1-hour SO_2 NAAQS be designated unclassifiable/attainment. The State is also requesting that EPA redesignate Woodbury County from unclassifiable to unclassifiable/attainment. This document provides technical information that supports these recommendations and fulfills the applicable obligations under the Data Requirements Rule (DRR).

Table of Contents

1. Background

On June 2, 2010, the U.S. Environmental Protection Agency (EPA) signed a final rule revising the sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS). EPA established a new 1-hour (hr) SO_2 primary NAAQS of 75 parts per billion (ppb), based on the three-year average of the annual 99th percentile of daily 1-hr maximum concentrations. The NAAQS revision was published in the Federal register on June 22, 2010 (75 FR 35519).

Whenever the NAAQS are revised the Clean Air Act (CAA) requires EPA to designate areas as attainment, nonattainment, or unclassifiable. For designation purposes, compliance with the NAAQS is typically determined using ambient monitoring data. However, unlike other criteria pollutants, SO_2 is almost exclusively emitted by point sources and "[d]ue to the generally localized impacts of SO_2, [EPA has] not historically considered monitoring alone to be an adequate, nor the most appropriate, tool to identify all maximum concentrations of SO_2" (75 FR 35551). Instead of using only monitoring data to assess compliance with the 1-hr SO_2 NAAQS, which would require a prohibitively expensive SO_2 monitoring network, EPA is using a hybrid approach by including the use of monitoring or modeling data.

In EPA's March 20, 2015, "*Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard*," area designation categories for this standard are defined as:

- Nonattainment: An area that EPA has determined violates the 2010 1-hr SO_2 NAAQS, based on the most recent three years of ambient air quality monitoring data or an appropriate modeling analysis, or that EPA has determined contributes to a violation in a nearby area.

- Attainment: An area that EPA has determined meets the 2010 1-hr SO_2 NAAQS and does not contribute to a violation of the NAAQS in a nearby area based on either: 1) the most recent 3 years of ambient air quality monitoring data from a monitoring network in an area that is sufficient to be compared to the NAAQS per EPA interpretations in the Monitoring Technical Assistance Document (TAD), or 2) an appropriate modeling analysis.

- Unclassifiable: An area where EPA cannot determine based on available information whether the area is or is not meeting the 2010 1-hr SO_2 NAAQS and whether the area contributes to a violation in a nearby area.

EPA is promulgating designations for the 1-hr SO_2 standard for areas throughout the nation in four rounds. EPA completed the first round in 2013 when they designated 29 areas in 16 states as nonattainment based on available monitoring data (78 FR 47191, August 5, 2013). A portion of Muscatine County, Iowa, was designated nonattainment in the first round. No other areas in Iowa or the nation were designated at that time. Subsequently lawsuits were filed because EPA did not finish the designation process within the CAA's three year deadline.

EPA resolved the litigation through a consent decree that contained applicability criteria and deadlines for three additional rounds of designations for the 1-hr SO_2 NAAQS. The consent decree was entered in federal court on March 2, 2015, between EPA and the plaintiffs Sierra Club and Natural Resources Defense Council. The three new rounds of designations are referred to as the second, third, and fourth rounds.

The deadline (meaning designations must be signed for publication in the Federal Register) for the second round of designations was July 2, 2016. Areas affected by the second round either contained a newly violating monitor or a stationary source that had not been announced for retirement (as defined in the consent decree) and that according to the data in EPA's Air Markets Database emitted:

- more than 16,000 tons of SO_2 emissions in 2012; or
- more than 2,600 tons of SO_2 and had an annual average emission rate of 0.45 lbs SO_2/MMBtu or higher in 2012.

In a letter to the Iowa Department of Natural Resource (DNR) dated March 20, 2015, EPA identified three sources in Iowa as meeting the above consent decree criteria: IPL's Burlington Generating Station, IPL's Ottumwa Generation Station, and MidAmerican Energy Co.'s George Neal South facility, located in Des Moines, Wapello, and Woodbury Counties, respectively. On November 4, 2015, the State recommended that those three counties be designated attainment. The technical support document (TSD) accompanying that recommendation was revised on December 23, 2015, to reflect a switch from modeling proposed potential SO_2 emission rates to modeling actual emission rates for IPL's Burlington and Ottumwa Generating Stations. The revised modeling results continued to predict attainment.

On July 12, 2016, EPA finalized the second round of 1-hr SO_2 designations (81 FR 45039). In Iowa, Des Moines and Wapello Counties were designated unclassifiable/attainment while Woodbury County was designated unclassifiable.

The federal consent decree requires that the third and fourth rounds of designations be completed by December 31, 2017, and December 31, 2020, respectively. All areas that have not installed and begun operating a new SO_2 monitoring network meeting EPA specifications by January 1, 2017, must be designated by December 31, 2017. All remaining undesignated areas must be designated by December 31, 2020.

1.1. Data Requirements Rule

To inform area designations in the final two rounds EPA is expected to use data that states must submit pursuant to the federal Data Requirements Rule (DRR, August 21, 2015, 80 FR 51051). The DRR requires states to identify air pollution emitting sources not located in a nonattainment area that emit 2,000 tons per year (tpy) or more of SO_2 and any other source identified as needing further air quality characterization for SO_2. Using the most recent data available at the time (2014) the Iowa DNR identified 11 sources with SO_2 emissions exceeding the 2,000 tpy threshold, see Table 1-1.[1] Neither the DNR nor EPA identified other sources as requiring further air quality characterization. In compliance with EPA's January 15, 2016, deadline, the DNR submitted the DRR source list on December 15, 2015.

Table 1-1 also includes the evaluation method chosen for each area that contains an affected source. The DRR (40 CFR 51.1203(b)) required that states notify EPA by July 1, 2016, whether they will: characterize peak 1-hr SO_2 concentrations in each area through ambient air quality monitoring; characterize peak 1-hr SO_2 concentrations in each area through air quality modeling techniques; or provide federally enforceable emission limitations by January 13, 2017, that limit emissions of applicable sources to less than 2,000 tpy, or provide documentation that the applicable source has permanently shut down. The DNR submitted the required information to EPA in a letter dated June 20, 2016.

[1] As required, sources identified pursuant to the consent decree emissions criteria for the second round of designations were also included in the DRR source list.

Table 1-1. Iowa sources identified and evaluation methods chosen pursuant to the DRR.

County	Facility ID	Facility Name	2014 SO_2 Emissions (tons)	Method
Allamakee	03-03-001	IPL - Lansing Generating Station	5,260	Limit emissions
Clinton	23-01-014	IPL - M. L. Kapp Generating Station	3,024	Limit emissions
Des Moines	29-01-013	IPL - Burlington Generating Station	3,657	Modeling
Linn	57-01-042	IPL - Prairie Creek Generating Station	4,033	Modeling
	57-01-080	ADM Corn Processing - Cedar Rapids	3,071	
Louisa	58-07-001	MidAmerican Energy Co - Louisa Station	8,783	Modeling
Pottawattamie	78-01-026	MidAmerican Energy Co - Walter Scott Jr Energy Center	13,749	Modeling
Scott	82-02-006	MidAmerican Energy Co - Riverside Station	2,167	Limit emissions
Wapello	90-07-001	IPL - Ottumwa Generating Station	9,227	Modeling
Woodbury	97-04-010	MidAmerican Energy Co - George Neal North	6,501	Modeling
	97-04-011	MidAmerican Energy Co - George Neal South	6,813	

1.2. Purpose

The purpose of this document is to provide information that both satisfies the remaining applicable requirements of the DRR and supports the State's amended designation recommendation.

To address the requirements of the DRR the DNR is evaluating SO_2 concentrations in each area using either dispersion modeling or by establishing new emission limits.[2] Since new SO_2 monitoring networks will not be deployed in Iowa for the DRR all areas in the state not currently designated for the 1-hr SO_2 NAAQS must be designated by December 31, 2017.

EPA's March 20, 2015 "*Updated Guidance for Area Designations for the 2010 Primary Sulfur Dioxide National Ambient Air Quality Standard*" lists five factors to be considered when developing boundary designation recommendations:

- Monitoring/Modeling data
- Meteorology
- Jurisdictional boundaries
- Emissions information, including growth, controls, and regional emission reductions
- Topography

The State has evaluated EPA's SO_2 designations guidance and is providing updated designation recommendations for EPA to consider in the third round of designations. These recommendations address all areas in the state not yet designated for the 1-hr SO_2 NAAQS. For purposes of designations and the DRR the dispersion modeling results for the affected sources in Linn, Louisa, and Pottawattamie Counties are discussed in detail in subsequent chapters, as are the emission limitations established for DRR affected sources that are limiting their SO_2 emissions to less than 2,000 tpy.

[2] In 2015 the State provided updated recommendations and supporting documentation for the second round of designations for Des Moines, Wapello, and Woodbury Counties. The associated TSD (updated December 23, 2015) included dispersion modeling results for IPL - Burlington Generating Station (Des Moines County), IPL - Ottumwa Generating Station (Wapello County), and MidAmerican Energy's George Neal South and George Neal North facilities (Woodbury County). That modeling is sufficient to satisfy the applicable requirements of the DRR under 40 CFR 51.1203(d). However, new information discussed in Section 6.1 supports redesignating Woodbury County from "unclassifiable" to "unclassifiable/attainment."

2. ADM Corn Processing - Cedar Rapids & IPL - Prairie Creek Generating Station (Linn County)

ADM Corn Processing - Cedar Rapids (ADM), a corn wet milling facility, and IPL - Prairie Creek Generating Station (Prairie Creek), an electric generating facility (power plant), are both located in Linn County, Iowa (see Figure 2-1 and Figure 2-2). Dispersion modeling was selected to characterize peak 1-hour SO_2 concentrations in this area. Based on the DNR's technical review an unclassifiable/attainment recommendation for all of Linn County is appropriate.

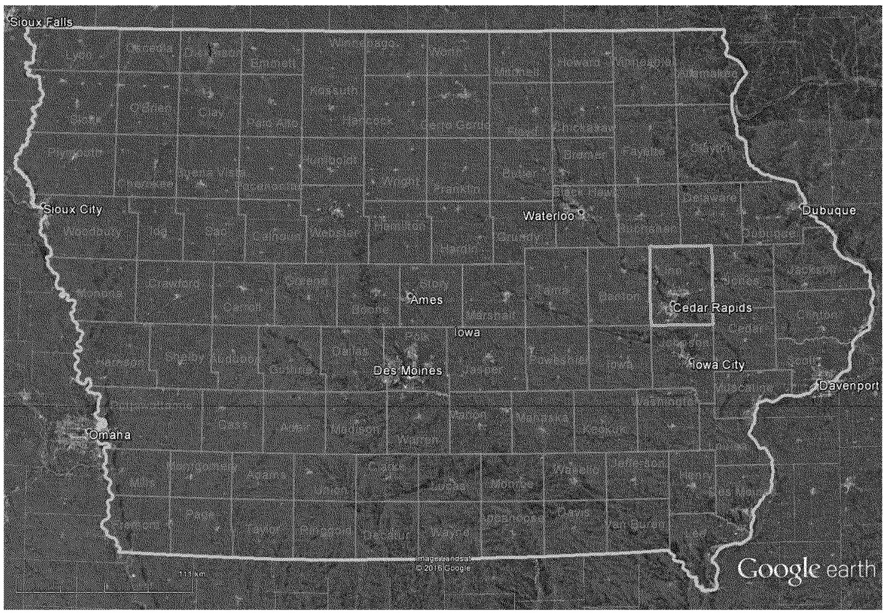

Figure 2-1. Location of Linn County, Iowa.

Figure 2-2. Location of ADM Corn Processing and IPL - Prairie Creek.

2.1. Source Characterization and Emission Rates

The pertinent SO_2 emission sources at ADM consist of five coal fired boilers. There are also numerous dryers, coolers, air heaters, and thermal oxidizers that are potential sources of SO_2. At IPL's Prairie Creek Generating Station the primary SO_2 emission sources are four coal fired boilers and two natural gas fired boilers. Intermittent emissions of SO_2 from emergency generators at both facilities and fire water pumps at ADM were excluded from this modeling analysis pursuant to Section 5.5 of EPA's draft "*SO_2 NAAQS Designations Modeling Technical Assistance Document*" (TAD) dated August 2016.

The vast majority of the SO_2 sources at both facilities vent to stacks with well-defined openings. These sources were modeled as point sources in AERMOD. There are two sets of steep tanks at ADM that are more fugitive in nature. These two sets of tanks were modeled as volume sources in AERMOD.

ADM and IPL - Prairie Creek modeled a combination of maximum permitted allowable and actual emissions with actual emissions derived from recent stack tests. Modeled emission rates are provided in Table 2-1 while Table 2-2 and Table 2-3 summarize the stack characteristics used in the 1-hr SO_2 modeling demonstration.

Table 2-1. ADM and IPL – Prairie Creek modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate* (lb/hr)
ADM Corn Processing – Cedar Rapids		
SEP002	Starch Drying	0.0302
SEP006	#2 Fluid Bed Germ Dryer	0.066[A]
SEP015	#1 Fluid Bed Germ Dryer	8.08[A]
SEP016	Fiber Feed	4.70
SEP034	Carbon Furnace	1.55[A]
SEP054	SO2 Dilution Tank	0.12
SEP069	190 Product Scrubbing	0.30
SEP076	Alcohol Loadout	0.02
SEP083	Wet Corn Hopper	1.15
SEP087	Biosolids Dryer	0.366
SEP089	Biosolids Dryer	0.366
SEP111	Corn Wet Milling	0.197
SEP114	Carbon Furnace #2	1.55[A]
SEP117	Corn Wet Milling	0.024
SEP118	Corn Wet Milling	0.05
SEP121	Maltodextrin - Evaporation	0.12
SEP122	Maltodextrin Spray Dryer	0.0206
SEP151	Fructose Evaporation	0.457
SEP152	Fructose Evaporation	0.457
SEP153	Dextrose & Steepwater Evap	0.12[A]
SEP154	Fructose Neutralization	0.017[B]
SEP155	Fructose Neutralization	0.017[B]
SEP159	Fructose Evaporation	0.45
SEP190	RTO #1	5.25[A]
SEP191	RTO #2 & #3	10.50[A]
SEP192	RTO #4 & #5	10.50[A]

Model ID	Unit Description	Modeling Emission Rate* (lb/hr)
SEP201	Heavy Gluten Storage Tank	0.196[A]
SEP204	Biomass Storage Tank	0.034[A]
SEP205	Heavy Steepwater Tank	0.182
SEP206	Steepwater Storage Tank	0.182
SEP210	Millhouse Fugitive Emissions	6.11
SEP211	Feedhouse SO2 Scrubbing	3.03[A]
SEP225	Corn Wet Milling	0.062
SEP226	Gluten Filter Vacuum Pump	0.70
SEP230	Gluten Filter Vacuum Pump	0.135[A]
SEP387	Heavy Steepwater Tank	0.20
SEP412	Anaerobic Digesters	1.50
SEP420	Fermentation, Distillation	2.21
SEP422	DDGS Cooler #1	4.48
SEP423	DDGS Cooler #2	4.48
SEP425	DDGS Dryer #1	1.01
SEP426	DDGS Dryer #2	1.01
SEP427	DDGS Dryer #3	1.01
SEP428	DDGS Dryer #4	1.01
SEP429	DDGS Dryer #5	1.01
SEP450	Alcohol Rail Loadout #1	0.10
SEP451	Alcohol Rail Loadout #2	0.10
SEP459	Natural Gas Boiler #1	0.17
SEP460	Natural Gas Boiler #2	0.17
SEP501	Co-Gen Boiler #1 & #2	235.9[C]
SEP502	Co-Gen Boiler #3 & #4	206.1[C]
SEP519	Boiler Room Sewer Tank	0.087
SEP530	Co-Gen Boiler #5	257.0[C]
STEEP	Steep Volume Sources	4.00[A]
IPL - Prairie Creek Generating Station		
B1&2	Boiler #1 & #2	123.9[D]
B#3	Boiler #3	129.3[E]
B#4	Boiler #4	0.81
B#5	Boiler #5	0.17
B6	Boiler #6	0.20

* Modeled emission rates are the maximum permitted allowable emission rates unless otherwise noted.

[A] Average actual emissions (predominantly year 2014 for ADM).

[B] Conservative overestimate of the 2012 actuals for these units.

[C] The modeled emission rates for SEP501, 502 and 530 are approximately 10% greater than the actual average emissions from 2012 through 2014.

[D] The IPL units B1&2 emission rate reflects the most recent average hourly continuous emission monitoring system (CEMS) data.

[E] In January 2015 IPL - Prairie Creek switched to a low sulfur coal. To provide the most accurate representation of actual emissions only CEMS data collected after the fuel switch was used to derive the average hourly emission rate for B#3.

Table 2-2. ADM and IPL - Prairie Creek point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
ADM Corn Processing – Cedar Rapids							
SEP002	608671	4642710	227.44	28.04	2.44	308.15	14.16
SEP006	608819	4642760	225.94	43.28	1.83	324.8	18.06
SEP015	608737	4642779	225.66	44.50	1.52	330.4	18.95
SEP016	608799	4642777	226.01	45.11	1.83	324.8	19.05
SEP034	608812	4642650	225.50	33.53	0.69	344.3	11.72
SEP054	608649	4642589	225.28	14.02	0.20	329.8	0.41
SEP069	608880	4642625	225.02	36.27	0.20	293.7	4.89
SEP076	609202	4642477	224.24	12.19	1.83	1033.2	10.96
SEP083	608630	4642769	226.45	27.74	0.46	331.5	7.76
SEP087	608992	4642623	223.97	15.24	0.10	327.6	VR
SEP089	608992	4642594	223.90	15.24	0.10	327.6	VR
SEP111	608706	4642678	226.72	14.33	0.20	338.7	0.68
SEP114	608818	4642662	225.42	33.53	0.69	344.3	11.72
SEP117	608675	4642642	226.52	15.54	0.08	338.7	0.52
SEP118	608662	4642655	226.88	9.75	0.30	308.2	0.08
SEP121	608662	4642649	226.77	16.46	0.15	338.7	VR
SEP122	608635	4642720	228.12	42.98	1.98	344.3	11.68
SEP151	608779	4642617	225.53	28.96	0.15	369.8	3.10
SEP152	608774	4642601	225.49	28.96	0.15	369.8	3.10
SEP153	608791	4642631	225.53	14.02	0.15	362.0	0.80
SEP154	608689	4642579	225.02	14.02	0.51	317.6	0.28
SEP155	608684	4642574	224.94	14.02	0.51	317.6	0.28
SEP159	608753	4642619	225.55	26.22	0.15	294.3	3.00
SEP190	608774	4642666	225.53	45.72	2.13	408.2	13.97
SEP191	608796	4642666	225.53	45.72	3.05	408.2	14.33
SEP192	608807	4642666	225.53	45.72	3.05	408.2	14.02
SEP201	608666	4642778	225.64	29.87	0.41	324.8	1.09
SEP204	608669	4642767	225.57	29.26	0.46	340.9	0.33
SEP205	608660	4642767	225.77	29.26	0.46	329.8	0.12
SEP206	608647	4642768	226.02	24.69	0.41	329.8	0.16
SEP210	608698	4642710	227.1	45.72	0.76	295.4	14.41
SEP211	608838	4642721	225.25	22.25	0.76	297.0	12.03
SEP225	608775	4642735	225.73	11.89	0.15	320.9	0.34
SEP226	608809	4642781	226.05	17.68	0.86	324.3	0.11
SEP230	608823	4642740	225.63	21.95	0.20	310.4	1.50
SEP387	608719	4642669	226.18	12.80	0.20	329.8	0.67
SEP412	608496	4640743	241.31	13.72	0.20	1088.7	18.29
SEP420	608662.3	4641324	247.73	30.48	1.52	360.9	20.34
SEP422	608720	4640977	245.36	30.48	1.22	340.4	22.03
SEP423	608737.4	4640977.5	245.90	30.48	1.22	340.4	22.03
SEP425	608708	4641099	248.33	54.86	1.07	505.4	20.70

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
SEP426	608742.9	4641100	246.92	54.86	1.07	505.4	20.70
SEP427	608707.4	4641076	247.95	54.86	1.07	505.4	20.70
SEP428	608742.2	4641076.5	246.72	54.86	1.07	505.4	20.70
SEP429	608707.1	4641052.5	247.62	54.86	1.07	505.4	20.70
SEP450	609629.3	4640828	245.42	9.14	2.44	1255.4	5.41
SEP451	608633	4640831.5	245.42	9.14	2.44	1255.4	5.41
SEP459	609067.1	4642242.4	226.26	22.86	1.98	418.7	15.69
SEP460	609067.1	4642233.1	226.46	22.86	1.98	418.7	15.69
SEP501	608807	4642262	225.83	106.68	3.51	454.3	19.65
SEP502	608807	4642262	225.83	106.68	3.51	456.5	19.61
SEP519	608810	4642716	225.52	12.19	0.15	317.0	0.47
SEP530	609046	4642261	226.22	125.58	3.66	427.6	20.99
IPL - Prairie Creek Generating Station							
B1&2	612843.7	4644412.9	221.91	99.67	4.87	516.5	8.10
B#3	612825.9	4644447.5	221.37	61.26	3.79	505.4	8.36
B#4	612742	4644450	220.89	61.26	3.96	438.2	21.87
B#5	612887.1	4644461.9	220.88	32.46	1.98	516.5	12.19
B6	612895.1	4644463.7	220.49	24.38	1.98	426.5	15.75

Table 2-3. ADM volume source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Release Height (m)	Initial Lateral Dimension (m)	Initial Vertical Dimension (m)
STEEPVS1	608692.7	4642764.5	225.62	25.91	18.20	0.58
STEEPVS2	608723.3	4642763	225.56	25.91	18.20	0.58

The emission rate modeled for Unit 4 (Boiler #4) at IPL's Prairie Creek Generating Station reflects a required conversion to natural gas. A federally enforceable consent decree (No. C15-0061 EJM) entered on September 2, 2015, in the United States District Court for the Northern District of Iowa, Cedar Rapids Division, between the United States of America; the State of Iowa; Linn County, Iowa; the Sierra Club; and IPL requires that Unit 4 retire or refuel (switch from combusting coal to natural gas) by June 1, 2018. However, IPL has committed, and will be required, to cease burning coal and to combust only natural gas in this unit as expeditiously as possible.

Beginning no later than December 31, 2017, Unit 4 must combust only natural gas. This requirement will be federally enforceable through air construction permit number 6652 to be issued by the Linn County Air Quality Division.[3] Additionally, between November 1, 2017 and December 30, 2017, Unit 4 is restricted to firing no more than a 50/50 blend of coal and natural gas with no more than 50% of the blend consisting of coal on a daily basis. These deadlines are as expeditious as practicable considering the modifications that must be made to facilitate the fuel conversion. They accommodate, for example,

[3] A public comment period for the draft permit was scheduled for December 1 to December 31, 2016. The final permit will be issued and federally enforceable in early 2017.

the natural gas supply lines modifications that must be completed, the installation of a gas preheater, which may require the purchase of neighboring land, and the time needed to ensure that Unit 4 will be able to provide its capacity without coal being fired long term.

For ADM the dispersion modeling analysis incorporates, and Table 2-2 reflects, updates to permitted stack parameters on four emission points. The modifications are federally enforceable through Authorization to Install (ATI) permits issued by the Linn County Air Quality Division. The stack height for emission point ID 210 (SEP210 in the model) must be raised from 46 to 150 ft (Linn County ATI permit 6925, issued August 17, 2016). ADM expects to complete this stack height increase in December 2016. Emission point 226 (SEP226) must be converted from a horizontal discharge to a vertical, unobstructed discharge (Linn County ATI permit 6974, issued November 30, 2016). Based on the information received in the permit application ADM anticipates completing this modification by January 31, 2017, which is eleven months in advance the December 31, 2017, designations deadline. The stack heights of emissions points 87 and 89 (SEP087 and SEP089) must both be raised to 50 ft and their orientation changed from horizontal to vertical, unobstructed (Linn County permits ATI 6975 and 6976, both issued on November 30, 2016). These stack modifications will be completed by May 31, 2017, the expiration date of the ATIs, which is seven months in advance of EPA's December 31, 2017, designations deadline.

2.2. Nearby Sources of SO_2

The SO_2 emission levels from facilities within 10 km were evaluated to determine if additional sources of SO_2 should be included in the modeling analysis. Table 2-4 summarizes all additional Title V sources within 10 km of ADM or IPL - Prairie Creek and their recent SO_2 emissions. Any source that would contribute a significant portion of the total SO_2 emissions in the area was identified to be included in the modeling analysis. The total average emissions for the area for both Title V and minor sources was 9,324 tpy, of which ADM and IPL - Prairie Creek are the primary contributors, and Cargill and Ingredion are secondary contributors at an average of 193 tpy and 93 tpy, respectively. All other sources combined only contribute 0.1%. In addition, a search was performed for major sources of SO_2 within 10-20 km. No facilities were identified in this area. Therefore the only sources included in the modeling analysis are ADM Corn Processing, IPL - Prairie Creek, Cargill, and Ingredion. Emission rates and stack parameters for Cargill and Ingredion can be found in Appendix A.

Table 2-4. Title V Facilities within 10 km of ADM and IPL - Prairie Creek.

		SO_2 Emissions (tpy)*			
Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
ADM Corn Processing - Cedar Rapids	1350 Waconia Avenue, SW Cedar Rapids, IA 52404	6,275.71	3,163.48	3,071.25	4,170.2 (avg)
IPL - Prairie Creek Generating Station	3300 C St SW Cedar Rapids, IA	3,590.7	2,917.13	8,065.55	4,857.79 (avg)
Cargill Inc.	1710 16th St SE Cedar Rapids, IA	239.4	263.63	75.8	192.94 (avg)
Ingredion (fka Penford Products Co)	1001 1st St SW Cedar Rapids, IA	82.45	149.42	46.02	92.63 (avg)
BioSpringer North America Corp	940 60th Ave SW Cedar Rapids, IA	0	0	0	0 (avg)
Cargill Inc. - Soybean West Plant	1110 12th Ave SW Cedar Rapids, IA	0.07	0.07	0.07	0.07 (avg)

		SO$_2$ Emissions (tpy)*			
Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
Cargill Inc. - Soybean East Plant	410 C Ave NE Cedar Rapids, IA	0.18	0.16	0.15	0.163 (avg)
Cedar Rapids WPCF	7525 Bertram Rd SE Cedar Rapids, IA	0.98	0.90	2.82	1.57 (avg)
Cedar River Paper Company	4600 C St SW Cedar Rapids, IA	NA	0.02	0.01	0.015 (avg)
Diamond V Mills Inc - North Plant	436 G Ave NW Cedar Rapids, IA	0.04	0.04	0.06	0.05 (avg)
General Mills Operation Inc	4800 Edgewood Rd SW Cedar Rapids, IA	1.29	1.20	1.11	1.20 (avg)
PMX Industries Inc	5300 Willow Creek Dr Cedar Rapids, IA	0.90	0.15	0.37	0.47 (avg)
Quaker Oats Co	418 2nd St NE Cedar Rapids, IA	0.13	0.22	0.17	0.17 (avg)
Red Star Yeast Co LLC	950 60th Ave SW Cedar Rapids, IA	0	0	0	0 (avg)
	Total Average Emissions	**9,317.22**			

* Major sources report emissions every year while minor sources report at most once every three years. Due to the large number of sources within 10 km only Title V sources are listed in this table. An additional 73 minor sources were evaluated most of which had zero to negligible SO$_2$ emissions from this three year span and therefore were not listed above.

2.3. Dispersion Model

The EPA recommended American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) was used to perform the analysis. The most current version (Version 15181) of AERMOD available at the time of the analysis was used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD were also used:

- BPIP-Prime (Version 04274)
- AERMET (Version 14134)
- AERMAP (Version 11103)

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD was run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from AERMAP
- SO$_2$ pollutant keyword

2.4. Receptor Grid

Receptors were sited outside of the fence line boundary of ADM, IPL- Prairie Creek, Cargill, and Ingredion. Receptors were placed at the following spacing out to 10 kilometers from these four facilities:

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 5 km
- 1000 meters extending from 5 km to 10 km

Consistent with Section 4.2 of the TAD, receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Cedar River. Figure 2-3 shows the receptor grid for the modeling analysis.[4]

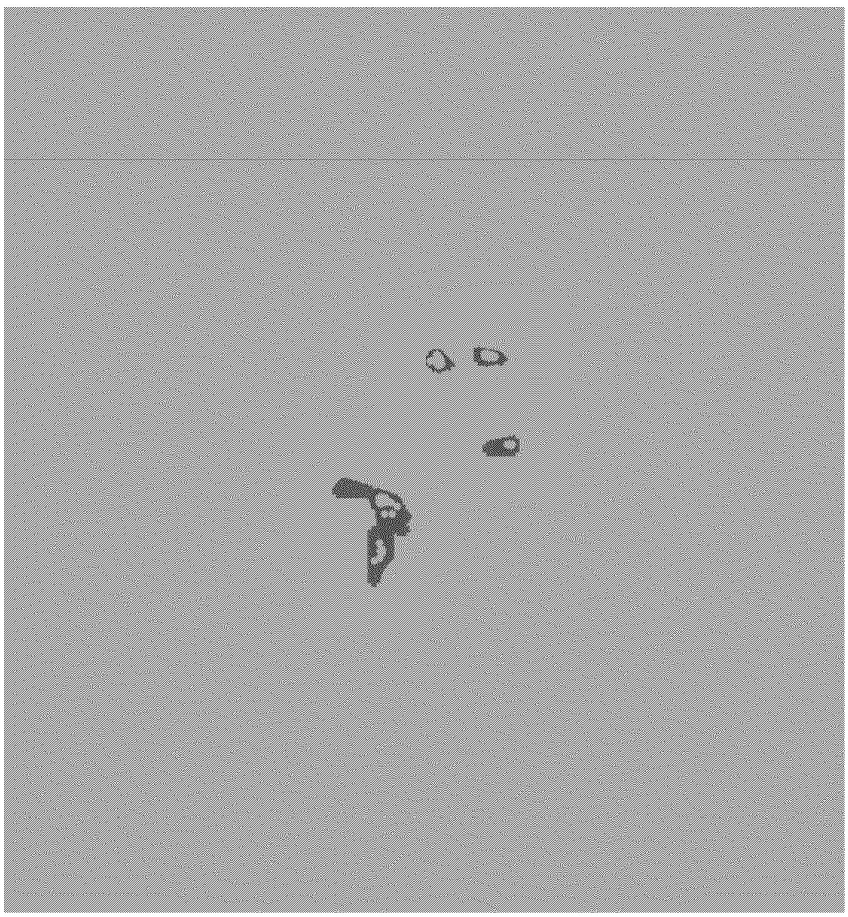

Figure 2-3. Dispersion modeling receptor grid.

[4] This image also depicts receptors being removed over roadways and the airport, which is no longer allowed according to the most recent modeling TAD. A full grid modeling analysis was conducted to address this situation and no exceedances were predicted.

Interpolated terrain elevations were input to the model using United States Geological Survey (USGS) National Elevation Dataset (NED) data for Linn and Johnson Counties in North American Datum 1983 (NAD83). All receptors were assigned a terrain height and hill height using the terrain preprocessor AERMAP.

2.5. Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the DNR. The surface data was collected from the Cedar Rapids (KCID) station with upper air data from the Davenport NWS station (KDVN) for calendar years 2012 through 2014. Based on the results from a representivity study conducted by the DNR,[5] these meteorological data are considered representative of the conditions near ADM and IPL - Prairie Creek. Figure 2-4 shows the 2012-2014 3-year wind rose for the KCID station.

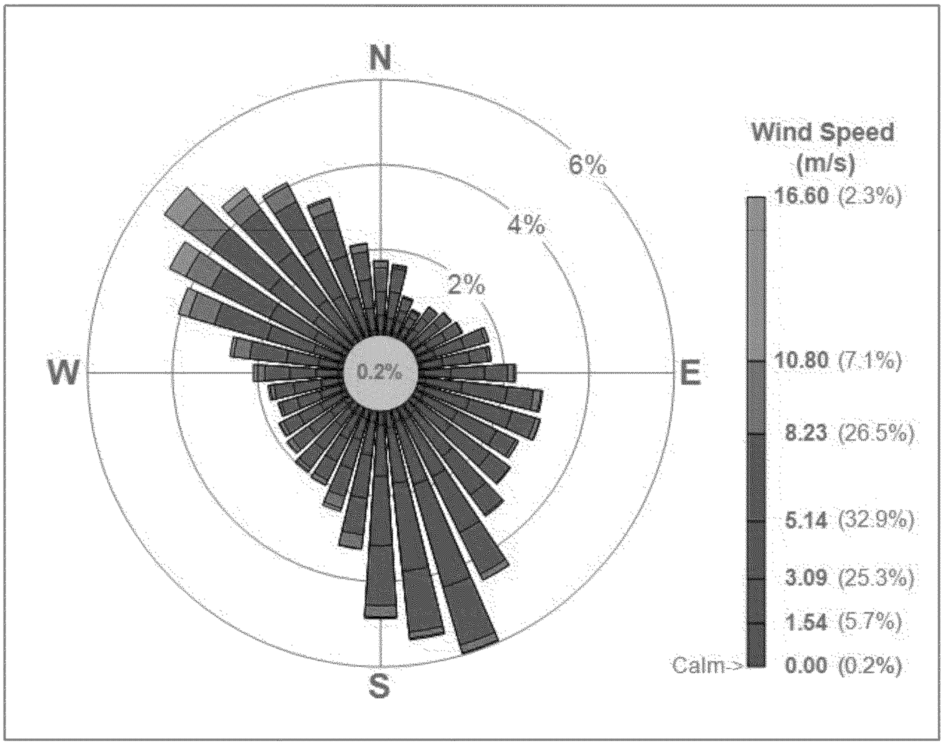

Figure 2-4. Cedar Rapids (KCID) 3-year wind rose (2012-2014).

2.6. Background Concentration

A 1-hr SO_2 background concentration of 7 $\mu g/m^3$ was added to the model design value for comparison to the NAAQS. This background concentration was proposed in the submitted modeling protocol and subsequently approved by the DNR. It represents the 2012-2014 design concentration at the Lake Sugema monitor. The DNR has determined that this concentration is more representative of natural background levels in the absence of nearby SO_2 emissions. This is an appropriate background concentration to use because all significant nearby sources of SO_2 are included in the modeling analysis.

[5] The "*2010 - 2015 AERMOD Met Data Technical Support Document*" available at: http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/MeteorologicalData.aspx

The model design value was used in conjunction with the background concentration for comparison to the NAAQS. For SO_2, consistent with EPA guidance, the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hr modeled concentration was added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hr concentration at each receptor using the SO_2 pollutant keyword.

2.7. Modeling Results

Following the AERMOD dispersion modeling approach described above, Table 2-5 summarizes the AERMOD output model design value, background concentration, and total concentration for comparison to the 1-hr SO_2 NAAQS.

Table 2-5. Model predicted concentration (µg/m^3) for the ADM and IPL - Prairie Creek analysis.

Scenario	Model Design Value	Background Concentration	Total Concentration	1-Hour SO_2 NAAQS	Above NAAQS?
ALL	157	7	164	196	No

2.8. Designation Recommendation

The modeling results predict that the largest SO_2 sources in the area, ADM, IPL – Prairie Creek, Cargill, and Ingredion, will not cause or contribute to a violation of the 1-hour SO_2 NAAQS. This analysis incorporates four of the five factors listed in EPA's March 20, 2015, designations guidance that states should consider when developing boundary designation recommendations. To address the remaining factor, jurisdictional boundaries, the State has selected the county boundary as providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Based on these considerations the State is recommending that Linn County be designated unclassifiable/ attainment for the 1-hr SO_2 NAAQS.

3. MidAmerican Energy - Louisa Generating Station (Louisa County)

MidAmerican Energy Co.'s Louisa Generating Station (Louisa) is a coal-fired electric generating facility located in Louisa County, Iowa, (see Figure 3-1 and Figure 3-2). Dispersion modeling was selected to characterize peak 1-hour SO_2 concentrations in this area. Based on the DNR's technical review an unclassifiable/attainment recommendation for all of Louisa County is appropriate.

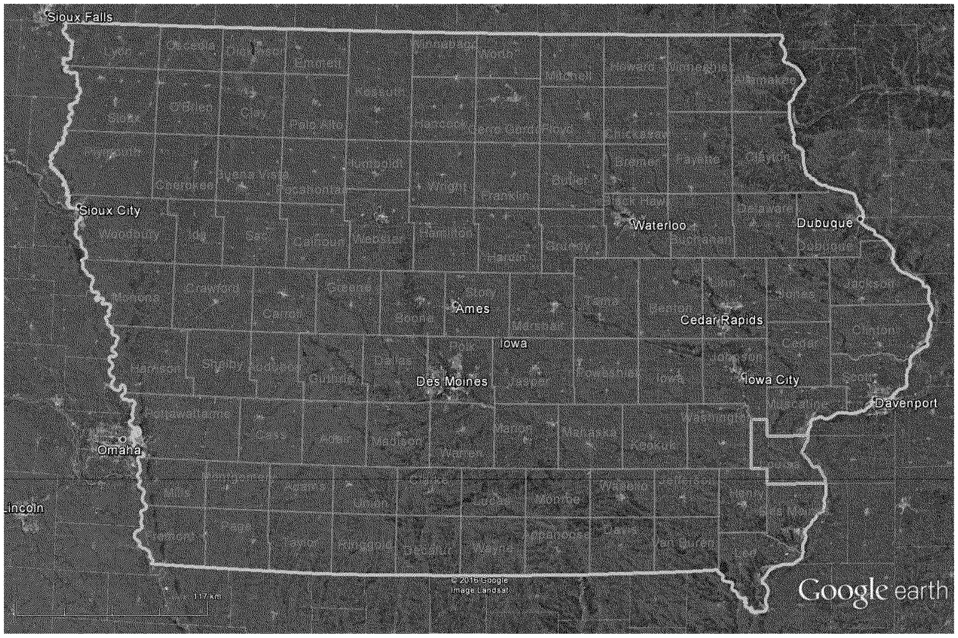

Figure 3-1. Location of Louisa County, Iowa.

Figure 3-2. Location of Louisa Generating Station.

3.1. Source Characterization and Emission Rates

The pertinent SO_2 emission sources at Louisa are a coal-fired main boiler and two auxiliary boilers. Intermittent emissions of SO_2 from emergency generators and oil-firing of the auxiliary boilers were excluded from this modeling analysis pursuant to Section 5.5 of EPA's draft *"SO_2 NAAQS Designations Modeling Technical Assistance Document"* (TAD), dated August 2016.

Auxiliary Boiler 1 and Auxiliary Boiler 2 are considered natural gas units. They are limited to utilizing fuel oil intermittently. Therefore, the units were modeled to represent normal operation with emission rates that reflect potential SO_2 emissions while utilizing natural gas as a fuel.

For the Main Boiler (Model ID EP01) the current 30-day rolling permit limit and actual emissions data was used to develop an hourly emission rate per the approach outlined in the EPA *Guidance for 1-Hour SO_2 Nonattainment Area SIP* Submissions memorandum released on April 23, 2014, as follows:

1. Evaluate existing continuous emission monitoring data for the Main Boiler at the Louisa Generating Station to develop a ratio of 30-day rolling averages to hourly emissions. This ratio was developed as the 99th percentile of the five year dataset from 2010 to 2014.
2. The ratio was used to develop an hourly emission rate using the current 30-day rolling permit limit.
3. The 1-hr emission rate was used in the modeling analysis.

Step 1 above resulted in a ratio of 0.8077. This ratio was then applied to the current 30-day rolling average permit limit (also referred to here as potential to emit or PTE) of 3,449.6 pounds per hour, resulting in the modeled 1-hr emission rate shown in Table 3-1. Table 3-2 summarizes the stack characteristics used in the 1-hr SO_2 modeling demonstration.

Table 3-1. Louisa Generating Station modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate (lb/hr)
EP01	Main Boiler	4,270.89 (PTE)
EP02	Auxiliary Boiler 1 (NG)	0.06 (PTE)
EP03	Auxiliary Boiler 2 (NG)	0.06 (PTE)

Table 3-2. Louisa Generating Station point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
EP01	659586.2	4575826	176.95	185.93	9.14	355.4	25.78
EP02	659550.2	4575698	177.28	24.38	1.35	449.8	7.03
EP03	659546.2	4575698	177.29	24.38	1.35	449.8	7.03

3.2. Nearby Sources of SO_2

The SO_2 emission levels from facilities within 10 km were evaluated to determine if additional sources of SO_2 should be included in the modeling analysis. The sources included in the Muscatine 1-hr SO_2 nonattainment SIP are within 10 km of Louisa and were evaluated as part of the Louisa DRR analysis. These sources included Grain Processing Corporation (GPC), Muscatine Power and Water (MPW), and

Monsanto. Since these sources were included in the modeling by default the magnitude of their emissions was not considered as a possible mechanism to screen them from further analysis.

Table 3-3 summarizes all additional sources within 10 km of Louisa Generating Station and their recent SO_2 emissions. Any source that would contribute a significant portion of the total SO_2 emissions in the area was identified to be included in the modeling analysis. The total average emissions for the area – excluding GPC, MPW, and Monsanto – were 8,603.57 tpy, of which Louisa Generating Station is the primary contributor. All other sources combined only contribute 0.003%. Therefore, the only sources within 10 km included in the modeling analysis were GPC, MPW, and Monsanto. These three facilities were modeled using the same emission rates and source parameters as were used in the Muscatine nonattainment SIP control strategy analysis, with the exception of the boiler at Monsanto (EP195), which was modeled using actual emissions.

In addition, a search was performed for major sources of SO_2 within 10-20 km. Three facilities were identified in this area: HJ Heinz, HNI Corp. - Central Campus, and HNI Corp. - North Campus. These three facilities had a maximum combined SO_2 emission rate of 0.22 tpy during the three-year period 2012-2014. This is only 0.003% of the average emissions from Louisa. As such, these facilities were not added to the modeling analysis.

Table 3-3. Facilities within 10 km of Louisa Generating Station (excluding nonattainment SIP Sources).

		SO_2 Emissions (tpy)*			
Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
MidAmerican Energy Co - Louisa Generating Station	8602 172nd Street Muscatine IA 52761	8,743.23	8,284.62	8,782.81	8603.55 (avg)
Natural Gas Pipeline Co of America	Us Hwy 61 & County Rd	0	0	0.04	0.01 (avg)
Union Tank Car Co Muscatine	2603 Dick Drake Way Muscatine IA	0.01	0.01	0.01	0.01 (avg)
McKee Button	1000 Hershey Ave Muscatine IA	0	0	0	0 (avg)
Bakery Feeds	2579 Pettibone Ave Muscatine IA				0.11
Potters Industries LLC	4907 55th Ave W Muscatine IA				0.11
Acme Materials CO	2544 Pettibone Ave Muscatine IA	0			0
Bridgestone Bandag LLC	6501 49th St S Muscatine IA	0			0
CHS Muscatine	2637 Pettibone Ave Muscatine IA	0			0
Musco Sports Lighting LLC	2107 Stewart Rd Muscatine IA	0			0
Hahn Ready Mix Inc	2470 Industrial Connector Rd				0
Hoffmann Inc	6001 49th St S Muscatine IA				0
Menasha Packaging	3206 Hershey Ave Muscatine IA				0

		SO_2 Emissions (tpy)*			
Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent** (or average)
Pretium Packaging LLC	5408 61st Ave W Muscatine IA				0
The Dallas Group of America	5000 W 55th Ave Muscatine IA				0
Tire Environmental Services Inc	1602 Musser St Muscatine IA				0
Bandag, Inc - Plant 4	6501 49th St S Muscatine IA				NA**
Bandag, Inc - Plant 5	6501A 49th St S Muscatine IA				NA**
Custom Feeds, Inc	2392 231 St Muscatine IA				NA**
Earthcare Recycling, Inc	2472 33rd St S Muscatine IA				NA**
Muscatine County Humane Society	920 S Houser St Muscatine IA				NA**
Quick Strip Company	810 Division St Muscatine IA				NA**
	Total Average Emissions	**8,603.79**			

* Major sources report emissions every year while minor sources report at most once every three years. If the latest available inventory for a minor source predates 2012 then the facility's emissions are listed only in the "Most Recent" column. The "Most Recent" column also includes the 3-year average emission rates for major sources.

**No emissions data found (but no SO_2 emissions are anticipated).

3.3. Dispersion Model

The EPA recommended American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) was used to perform the analysis. The most current version (Version 15181) of AERMOD available at the time of the analysis was used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD were also used:

- BPIP-Prime (Version 04274)
- AERMET (Version 14134)
- AERMAP (Version 11103)

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD was run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from AERMAP
- SO_2 pollutant keyword

3.4. Receptor Grid

Receptors were sited outside of the fence line boundary of the Louisa Generating Station in two phases. First, receptors were placed at the following spacing out to 10 kilometers from the Louisa fence line, except for within the Muscatine nonattainment area:

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 5 km
- 1000 meters extending from 5 km to 10 km

Second, within the Muscatine nonattainment area receptors were placed in the exact same locations as were used in the nonattainment SIP analysis. The nonattainment area receptor grid was centered on the Musser Park monitor at the northern end of GPC's property, extending away with decreasing resolution using receptor spacing similar to that described above. Additional refined receptor spacing was used within the nonattainment area receptor grid surrounding GPC, MPW, Monsanto, and Louisa Generating Station's northern fence line.

Consistent with Section 4.2 of the TAD, receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Mississippi River. Figure 3-3 shows the receptor grid for the modeling analysis.

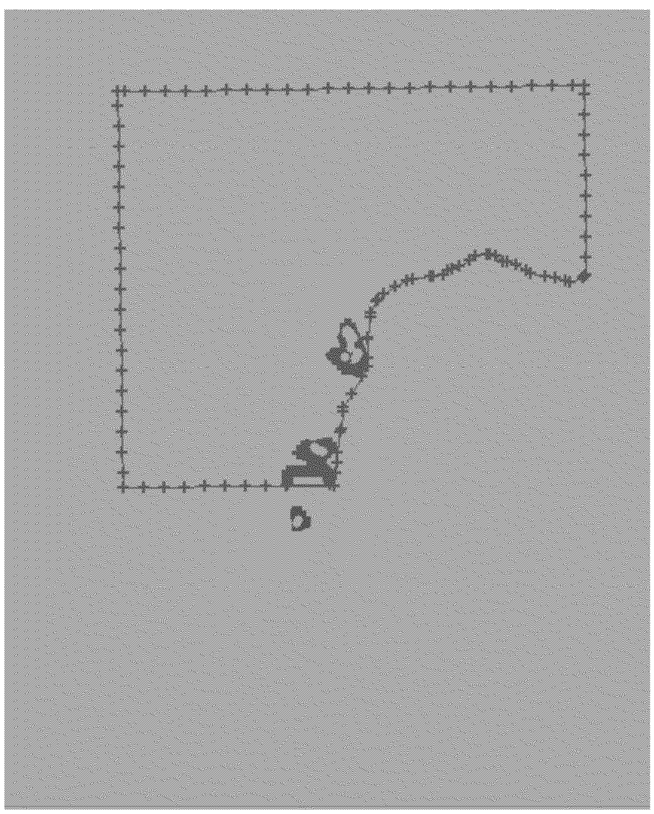

Figure 3-3. Dispersion modeling receptor grid surrounding Louisa Generating Station.

Interpolated terrain elevations were input to the model using United States Geological Survey (USGS) National Elevation Dataset (NED) data for Louisa and Muscatine Counties in North American Datum 1983 (NAD83). All receptors were assigned a terrain height and hill height using the terrain preprocessor AERMAP.

3.5. Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the DNR. The surface data was collected from the Iowa City (KIOW) station with upper air data from the Davenport NWS station (KDVN) for calendar years 2012 through 2014. Based on the results from a representivity study conducted by the DNR,[6] these meteorological data are considered representative of the conditions near the Louisa Generating Station. Figure 3-4 shows the 2012-2014 3-year wind rose for the KIOW station.

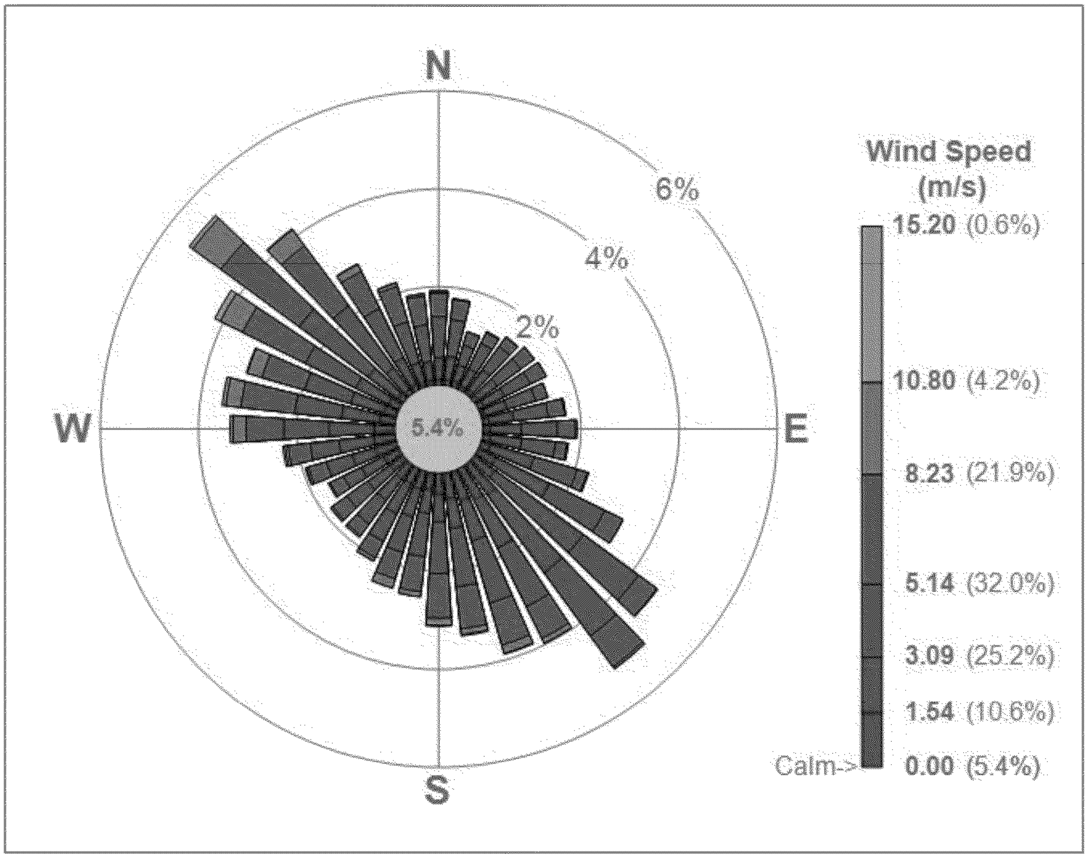

Figure 3-4. Iowa City (KIOW) 3-year wind rose (2012-2014).

3.6. Background Concentration

A 1-hr SO_2 background concentration of 7 μg/m^3 was added to the model design value for comparison to the NAAQS. This background concentration was proposed in the submitted modeling protocol and subsequently approved by the DNR. It represents the 2012-2014 design concentration at the Lake

[6] The "*2010 - 2015 AERMOD Met Data Technical Support Document*" available at: http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/MeteorologicalData.aspx

Sugema monitor. The DNR has determined that this concentration is more representative of natural background levels in the absence of nearby SO_2 emissions. This is an appropriate background concentration to use because all significant nearby sources of SO_2 are included in the modeling analysis.

The model design value was used in conjunction with the background concentration for comparison to the NAAQS. For SO_2, consistent with EPA guidance, the receptor with the highest 3-year average of the 99^{th} percentile maximum daily 1-hr modeled concentration was added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99^{th} percentile 1-hr concentration at each receptor using the SO_2 pollutant keyword.

3.7. Modeling Results

Following the AERMOD dispersion modeling approach described above, Table 3-4 summarizes the AERMOD output model design value, background concentration, and total concentration for comparison to the 1-hr SO_2 NAAQS. The Muscatine nonattainment SIP analysis includes multiple scenarios depending on which boilers (Units 7, 8, or 9) are operating at MPW. Each scenario was evaluated as part of this analysis, along with Louisa's individual maximum concentration. The maximum concentration of 194 $\mu g/m^3$ is less than the 1-hr SO_2 NAAQS, and is attributable to sources in the nonattainment area.

Table 3-4. Model predicted concentration ($\mu g/m^3$) for the Louisa Generation Station analysis.

<table>
<tr><th>Scenario</th><th>Model Design Value</th><th>Maximum Design Value</th><th>Background Concentration</th><th>Total Concentration</th><th>1-Hour SO_2 NAAQS</th><th>Above NAAQS?</th></tr>
<tr><td>ALL</td><td>184.19</td><td rowspan="7">186.86</td><td rowspan="7">7</td><td rowspan="7">194</td><td rowspan="7">196</td><td rowspan="7">No</td></tr>
<tr><td>U7OFF</td><td>184.19</td></tr>
<tr><td>U7ONLY</td><td>186.86</td></tr>
<tr><td>U8OFF</td><td>186.53</td></tr>
<tr><td>U8ONLY</td><td>184.19</td></tr>
<tr><td>U9OFF</td><td>184.19</td></tr>
<tr><td>U9ONLY</td><td>186.53</td></tr>
<tr><td>Louisa Only</td><td>70.17</td></tr>
</table>

3.8. Designation Recommendation

The modeling results predict that neither the SO_2 emissions from Louisa, nor emissions from the sources in the nonattainment area, will cause or contribute to a violation of the 1-hour SO_2 NAAQS. This analysis incorporates four of the five factors listed in EPA's March 20, 2015, designations guidance that states should considered when developing boundary designation recommendations. To address the remaining factor, jurisdictional boundaries, the State has selected the county boundary as providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Based on these considerations the State is recommending that Louisa County be designated unclassifiable/attainment for the 1-hr SO_2 NAAQS. Information regarding the designation recommendation for the portion of Muscatine County outside of the Muscatine nonattainment area is in Section 6.2.

4. MidAmerican Energy - Walter Scott Jr. Energy Center (Pottawattamie County)

MidAmerican Energy Co.'s Walter Scott Jr. Energy Center (Walter Scott) is a coal-fired electric generating facility located in Pottawattamie County, Iowa (see Figure 4-1 and Figure 4-2). Dispersion modeling was selected to characterize peak 1-hour SO_2 concentrations in this area. Based on the DNR's technical review an unclassifiable/attainment recommendation for all of Pottawattamie County is appropriate.

Figure 4-1. Location of Pottawattamie County, Iowa.

Figure 4-2. Location of MidAmerican's Walter Scott Jr Energy Center.

4.1. Source Characterization and Emission Rates

The pertinent SO_2 emission sources at Walter Scott are two coal-fired main boilers and an auxiliary boiler. Intermittent emissions of SO_2 from emergency generators were excluded from this modeling analysis pursuant to Section 5.5 of EPA's draft *"SO_2 NAAQS Designations Modeling Technical Assistance Document"* (TAD), dated August 2016.

The Unit 4 Auxiliary Boiler is considered a natural gas unit. The unit was modeled to represent normal operation with an emission rate that reflects potential SO_2 emissions while utilizing natural gas as a fuel. The Unit 3 Boiler (Model ID EP003) was modeled using actual hourly emission rates from 2012-2014. For the Unit 4 Boiler the current 30-day rolling permit limit and actual emissions data was used to develop an hourly emission rate per the approach outlined in the EPA *Guidance for 1-Hour SO_2 Nonattainment Area SIP* Submissions memorandum released on April 23, 2014, as follows:

1. Evaluate existing continuous emission monitoring data for the Unit 4 Boiler at Walter Scott to develop a ratio of 30-day rolling averages to hourly emissions. This ratio was developed as the 99th percentile of the five year dataset from 2010 to 2014.
2. The ratio was used to develop an hourly emission rate using the current 30-day rolling permit limit.
3. The 1-hr emission rate was used in the modeling analysis.

Step 1 above resulted in a ratio of 0.8436. This ratio was then applied to the current 30-day rolling average permit limit of 0.1 lb/MMBtu (and the unit's maximum rated capacity of 7,675 MMBtu/hr), resulting in the modeled 1-hr emission rate shown in Table 4-1. Table 4-2 summarizes the stack characteristics used in the 1-hr SO_2 modeling demonstration.

Table 4-1. Walter Scott Energy Center modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate (lb/hr)
EP003	Unit 3 Boiler	Variable Actual Hourly (CEMS)
EP141	Unit 4 Boiler	909.8 (PTE)
EP142	Auxiliary Boiler (NG)	0.21 (PTE)

Table 4-2. Walter Scott Energy Center point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
EP003	261898.2	4562476.9	294.72	167.64	7.62	355.4	Varies hourly
EP141	262145.9	4562589.8	294.70	167.95	7.53	347.0	24.92
EP142	262017.0	4562476.0	294.50	88.39	1.75	427.6	20.54

4.2. Nearby Sources of SO_2

The SO_2 emission levels from facilities within 10 km of Walter Scott, which includes a portion of Nebraska, were evaluated to determine if additional sources of SO_2 should be included in the modeling analysis. Table 4-3 summarizes all additional Iowa sources and their recent SO_2 emissions. The Nebraska Department of Environmental Quality (NDEQ) was contacted to retrieve an inventory of Nebraska sources within 10 km or more of Walter Scott and no additional facilities were identified by the NDEQ. All sources that contribute a significant portion of the total SO_2 emissions in the area are included in the modeling analysis. The total average emissions for the area are 18,502.6 tpy, of which Walter Scott is the primary contributor. All other sources combined only contribute 0.03%. Therefore, no additional Iowa sources were included in the modeling.

Table 4-3. Iowa Facilities within 10 km of Walter Scott Jr. Energy Center.

Facility Name	**Address**	**2012**	**2013**	**2014**	**Most Recent (or average)**
Walter Scott Jr Energy Center	7215 Navajo St Council Bluffs, IA	28,146.8	13,593.3	13,749.3	18,496.5 (avg)
Griffin Pipe Products Inc	2601 9th Ave Council Bluffs, IA	5.35	2.59	0.27	2.74 (avg)
SIRE	10868 189th St Council Bluffs, IA	1.59	3.48	2.10	2.39 (avg)
Bunge North America Inc	19560 Bunge Ave Council Bluffs, IA	1.09	0.55	0.51	0.72 (avg)
Gable Corp	10420 Bunge Ave Council Bluffs, IA	N/A	N/A	0.01	0.01 (avg)
CHS McPherson Refinery Inc	825 Tank Farm Rd Council Bluffs, IA	0	0	0	0 (avg)
Tyson Fresh Meats	2700 23rd Ave Council Bluffs, IA				0.1
Mercy Hospital Infectious Waste Treatment Facility	800 Mercy Dr Council Bluffs, IA				0.08
Con Agra Foods	1023 S 4th St Council Bluffs, IA				0.03
Cargill	2401 S 37th St Council Bluffs, IA			0.01	0.01
Warren Distribution Inc	2850 River Rd Council Bluffs, IA				0.01
Barton Solvents Inc	2135 9th Ave Council Bluffs, IA			0	0
Jim Hawk Truck Trailers Inc	2918 S 9th St Council Bluffs, IA			0	0
Midwest Walnut Co	1914 Tostevin St Council Bluffs, IA			0	0
Western Engineering Co	330 29th Ave Council Bluffs, IA			0	0
Alter Metal Recycling	2603 9th Ave Council Bluffs, IA				0
Bartlett Grain Company – Ave L	1030 Ave L Council Bluffs, IA				0
Bartlett Grain Company	2600 S 4th St Council Bluffs, IA				0
Buckeye Terminals LLC	829 Tank Farm Rd Council Bluffs, IA				0
Bunge North America Inc – 3300 1st Ave	3300 1st Ave Council Bluffs, IA				0
Cohron Ready Mix LLC	10001 192nd St Council Bluffs, IA				0

Facility Name	Address	2012	2013	2014	Most Recent (or average)
Cresline Plastic Pipe Co.	2100 S 35th St Council Bluffs, IA				0
Future Foam Inc	400 N 10th St Council Bluffs, IA				0
GBW Railcar Services LLC	1101 S 21st St Council Bluffs, IA				0
Growmark Inc	2200 South Ave Council Bluffs, IA				0
Jennie Edminson Memorial Hospital	933 East Pierce St Council Bluffs, IA				0
Katelman Steel Fabrication	2030 2nd Ave Ste 1 Council Bluffs, IA				0
Omaha Standard Co	3501 S 11th St Council Bluffs, IA				0
Ready Mixed Concrete Company	1220 S 8th St Council Bluffs, IA				0
Reliance Battery Manufacturing Co	813 22nd Ave Council Bluffs, IA				0
Tetra LLC	1430 Veterans Memorial Hwy Council Bluffs, IA				0
Plumrose USA Inc	2650 23rd Ave Council Bluffs, IA				NA**
Century Link Communications	301 W 65th St Council Bluffs, IA				NA**
Rhoden Auto Center	3400 S Expressway St Council Bluffs, IA				NA**
Total Average Emissions		**18,502.6**			

* Major sources report emissions every year while minor sources report at most once every three years. If the latest available inventory for a minor source predates 2012 then the facility's emissions are listed only in the "Most Recent" column. The "Most Recent" column also includes the 3-year average emission rates for major sources.

**No emissions data found (but no SO_2 emissions are anticipated).

In addition, a search was performed for major sources of SO_2 within 10-20 km. One Iowa facility was identified in this area: Trajet Products Inc. However, this facility had no SO_2 emissions during the three-year period 2012-2014. As such, this facility was not added to the modeling analysis.

The NDEQ identified two sources of SO_2 within 10-20 km of Walter Scott (see Table 4-4). One of these, the Omaha Public Power District (OPPD) North Omaha facility, had SO_2 emissions large enough to warrant its inclusion in the modeling analysis. OPPD, a power plant, has shut down three of its coal boilers as of early 2016, but has two additional coal boilers that have been included at their actual CEMS hourly SO_2 emissions. A constant temperature and flow have been used for the units at OPPD. Emission rates and stack parameters for OPPD can be found in Appendix B.

Table 4-4. Nebraska Facilities within 20 km of Walter Scott Energy Center.

Facility Name (Distance to Walter Scott)	**Address**	**SO_2 Emissions 2011 NEI (tpy)**
OPPD North Omaha (19 km)	444 S 16th St Omaha, NE	14,070
Eppley Airfield (18 km)	4501 Abbott Dr. Omaha, NE	36

4.3. Dispersion Model

The EPA recommended American Meteorological Society (AMS)/EPA Regulatory Model (AERMOD) was used to perform the analysis. The most current version (Version 15181) of AERMOD available at the time of the analysis was used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD were also used:

- BPIP-Prime (Version 04274)
- AERMET (Version 14134)
- AERMAP (Version 11103)

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD was run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from AERMAP
- SO_2 pollutant keyword

4.4. Receptor Grid

Receptors were sited outside of the fence line boundary of Walter Scott in the following format.

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 10 km

Consistent with Section 4.2 of the TAD, receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Missouri River. Figure 4-3 shows the receptor grid for the modeling analysis, with OPPD located approximately 4.5 km north of the receptor grid.

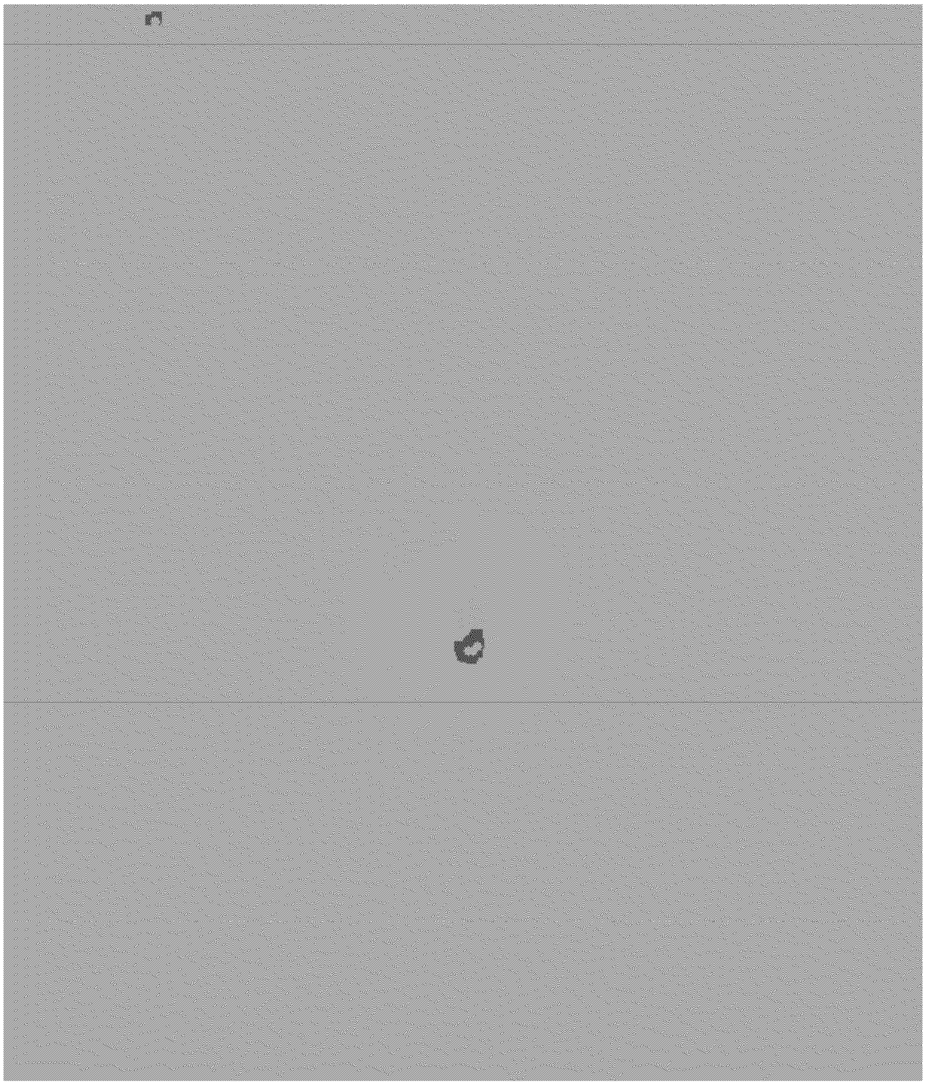

Figure 4-3. Dispersion modeling receptor grid surrounding Walter Scott.

Interpolated terrain elevations were input to the model using United States Geological Survey (USGS) National Elevation Dataset (NED) data for Pottawattamie (IA) and Douglas (NE) Counties in North American Datum 1983 (NAD83). All receptors were assigned a terrain height and hill height using the terrain preprocessor AERMAP.

4.5. Meteorological Data

Hourly meteorological data for the dispersion modeling analysis was preprocessed with the AERMET program by the DNR. The surface and upper air data was collected from the Omaha (KOMA) NWS station for calendar years 2012 through 2014. Based on the results from a representivity study conducted by the DNR,[7] these meteorological data are considered representative of the conditions near Walter Scott. Figure 4-4 shows the 2012-2014 3-year wind rose for the KOMA station.

[7] The "*2010 - 2015 AERMOD Met Data Technical Support Document*" available at: http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/MeteorologicalData.aspx

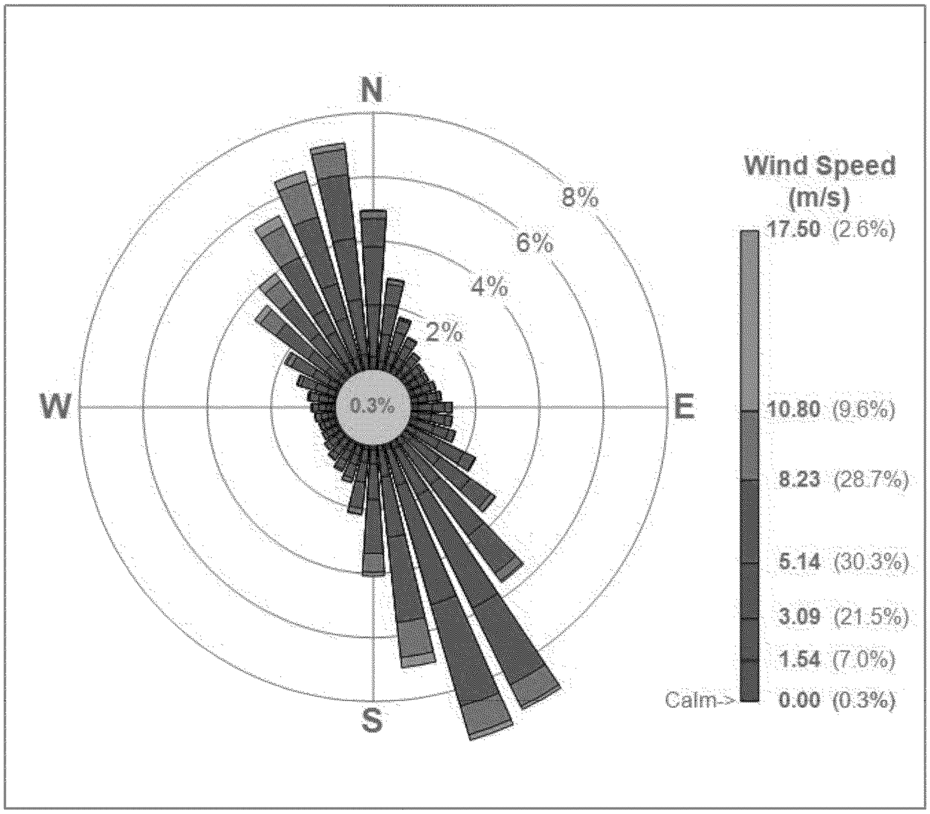

Figure 4-4. Omaha (KOMA) 3-year wind rose (2012-2014).

4.6. Background Concentration

A 1-hr SO_2 background concentration of 7 µg/m^3 was added to the model design value for comparison to the NAAQS. This background concentration was proposed in the submitted modeling protocol and subsequently approved by the DNR. It represents the 2012-2014 design concentration at the Lake Sugema monitor. The DNR has determined that this concentration is more representative of natural background levels in the absence of nearby SO_2 emissions. This is an appropriate background concentration to use because all significant nearby sources of SO_2 are included in the modeling analysis.

The model design value was used in conjunction with the background concentration for comparison to the NAAQS. For SO_2, consistent with EPA guidance, the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hr modeled concentration was added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hr concentration at each receptor using the SO_2 pollutant keyword.

4.7. Modeling Results

Following the AERMOD dispersion modeling approach described above, Table 4-5 summarizes the AERMOD output model design value, background concentration, and total concentration for comparison to the 1-hr SO_2 NAAQS.

Table 4-5. Model predicted concentration (μg/m^3) for the Walter Scott analysis.

Scenario	Model Design Value	Background Concentration	Total Concentration	1-Hour SO_2 NAAQS	Above NAAQS?
ALL	127.0	7	134	196	No

4.8. Designation Recommendation

The modeling results predict that SO_2 emissions from MidAmerican Energy's Walter Scott Jr. Energy Center will not cause or contribute to a violation of the 1-hour SO_2 NAAQS. This analysis incorporates four of the five factors listed in EPA's March 20, 2015, designations guidance that states should consider when developing boundary designation recommendations. To address the remaining factor, jurisdictional boundaries, the State has selected the county boundary as providing a clearly defined legal boundary for carrying out the air quality planning and enforcement functions for the area. Based on these considerations the State is recommending that Pottawattamie County be designated unclassifiable/attainment for the 1-hr SO_2 NAAQS.

5. Sources Limiting their Maximum Permitted Allowable Emissions

Three DRR sources in Iowa are subject to federally enforceable emission limits that restrict their potential SO_2 emissions to below 2,000 tpy. These sources are IPL - Lansing Generating Station in Allamakee County, IPL - M. L. Kapp Generating Station in Clinton County, and MidAmerican Energy Co. - Riverside Station in Scott County.

To comply with 40 CFR 51.1203(e) the DNR must submit documentation to EPA by January 13, 2017, showing that the necessary enforceable requirements have been adopted, are in effect, and have been made federally enforceable by January 13, 2017. In Iowa these requirements are addressed in one of two ways, either emission limits and operating conditions established in air construction permits issued pursuant to the State's SIP-approved preconstruction permitting program, or through restrictions established in a consent decree between the United States of America; the State of Iowa; Linn County, Iowa; the Sierra Club; and IPL. The details of each facility's applicable restrictions are discussed below. Since nearly all SO_2 emissions at each facility are attributable to coal combustion only the limitations on the coal-fired boilers are reviewed.

5.1. IPL - Lansing Generating Station (Allamakee County)

Unit 4 is the only remaining coal-fired boiler at IPL's Lansing Generating Station. Units 1, 2, and 3 are permanently shut down and their air construction permits have been rescinded.[8] A federally enforceable consent decree (No. C15-0061 EJM) entered on September 2, 2015, in the United States District Court for the Northern District of Iowa, Cedar Rapids Division, between the United States of America; the State of Iowa; Linn County, Iowa; the Sierra Club; and IPL requires that, commencing no later than 30 operating days after December 31, 2016, and continuing thereafter, Lansing Unit 4 must achieve and maintain a 30-day rolling average emission rate for SO_2 of no greater than 0.075 lb/MMBtu. Assuming continuous operation, the 0.075 lb/MMBtu emission limit, in combination with the unit's maximum rated capacity of 2,603 MMBtu/hr, will limit the facility's maximum permitted allowable SO_2 emissions to 855 tpy. The 0.075 lb/MMBTU SO_2 emission limit goes into effect on December 31, 2016 (with the first compliance date 30 days thereafter). At the request of the facility, through applications received on February 26, 2016, the DNR will include the 0.075 lb/MMBtu emission limit in a federally enforceable air construction permit.

There are no other SO_2 sources in Allamakee County subject to the DRR. The State is recommending that Allamakee County be designated unclassifiable/attainment.

5.2. IPL - M. L. Kapp Generating Station (Clinton County)

At IPL's M. L. Kapp Generating station all coal combustion activities have ceased. Unit 1 is permanently shut down and its air construction permit has been rescinded.[9] Unit 2 switched fuel from coal to natural gas ahead of the August 31, 2015, deadline established in the federally enforceable consent decree referenced above (No. C15-0061 EJM). Since Unit 2 must only burn natural gas and is prohibited by Condition 14.A in air construction permit 78-A-157-P9 from burning more than 10,746,943,000 cubic

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[8] The air construction permit for Units 1 and 2 at IPL's Lansing Generating Station (permit number 74-A-097-S2) was rescinded on February 4, 2011. The air construction permit for Unit 3 (permit number 73-A-132-S5) was rescinded on July 3, 2013. Copies of the permit rescission letters are available upon request.

[9] The air construction permit for Unit 1 at IPL's M. L. Kapp Generating Station (permit number 74-A-177-S) was rescinded on February 4, 2011. A copy of the permit rescission letter is available upon request.

feet of natural gas per rolling 12-month period, this source has the potential to emit approximately 3 tpy of SO_2.

There are no other SO_2 sources in Clinton County subject to the DRR. The State is recommending that Clinton County be designated unclassifiable/attainment.

5.3. MidAmerican Energy - Riverside Station (Scott County)

Two of the three coal-fired boilers at MidAmerican Energy Co.'s - Riverside Station have permanently retired from service and no longer have air construction permits.[10] The remaining boiler, Unit 9, is restricted to burning only natural gas by a federally enforceable condition established in air construction permit 93-A-339-S2. This constraint, in combination with Unit 9 having a maximum rated capacity of 1,202 MMBtu/hr, limits potential SO_2 emissions from this source to approximately 3 tpy.

There are no other SO_2 sources in Scott County subject to the DRR. The State is recommending that Scott County be designated unclassifiable/attainment.

[10] The air construction permits for Units 7 and 8 (72-A-009-S1 and 72-A-010-S1, respectively) were rescinded on September 4, 2015. A copy of the rescission letter is available upon request.

6. Remaining Areas in Iowa

6.1. Woodbury County

On December 23, 2015 the DNR provided to EPA a modeling analysis[11] of SO_2 emissions from MidAmerican Energy Co.'s George Neal South and George Neal North generating stations. There is one coal-fired boiler at George Neal South (identified as Unit 4). At that time there were three coal-fired boilers at George Neal North (identified as Unit 1, Unit 2, and Unit 3). However, the DNR chose to model Units 1 and 2 as burning only natural gas because a consent agreement between MidAmerican and the Sierra Club required those units to cease utilization of coal as a fuel by April 16, 2016. On July 12, 2016 (81 FR 45039) EPA chose to designate Woodbury County as unclassifiable because the consent agreement between MidAmerican and the Sierra Club was not federally enforceable.

New information supports a designation of unclassifiable/attainment. The DNR rescinded the air construction permits for George Neal North Units 1 and 2, permit numbers 05-A-878-P1 and 07-A-951-P1, respectively, on September 9, 2016. With the rescission of those permits Units 1 and 2 are now prohibited from operating. Since the original modeling (which reflected Units 1 and 2 burning natural gas) predicted attainment with the NAAQS there is no need to update the analysis to reflect the removal of these two sources.

This supports the State's request to redesignate Woodbury County to unclassifiable/attainment.

6.2. Remainder of Muscatine County

In 2013 EPA designated a portion of Muscatine County as nonattainment for the 2010 1-hr SO_2 NAAQS. The nonattainment designation was published in the Federal Register on August 5, 2013, (78 FR 47191) with an effective date of October 4, 2013. The extent of the nonattainment area is defined in the Code of Federal Regulations (CFR) at 40 CFR 81.316 using the sections and townships listed in Table 6-1.

Table 6-1. Summary of the legal description of the 1-hr SO_2 nonattainment area in Muscatine County.

Sections 1-3, 10-15, 22-27, 34-36 of T77N, R3W (Lake Township)
Sections 1-3, 10-15, 22-27, 34-36 of T76N, R3W (Seventy-six Township)
T77N, R2W (Bloomington Township)
T76N, R2W (Fruitland Township)
All sections except 1, 12, 13, 24, 25, 36 of T77N, R1W (Sweetland Township)

The nonattainment area encompasses all relevant SO_2 sources and the locations of expected maximum 1-hour SO_2 concentrations in Muscatine County. On May 17, 2016, the DNR submitted to EPA the required attainment plan containing the control measures necessary to provide for attainment of the 2010 1-hr SO_2 NAAQS throughout the nonattainment area. Additionally, the analysis of Louisa Generating Station (LGS) discussed in Chapter 3 shows that LGS will not cause or contribute to a 1-hour SO_2 NAAQS violation in Muscatine County. Therefore, the remainder of Muscatine county is attaining the 1-hr SO_2 standard and the State is recommending that it be designated unclassifiable/attainment.

6.3. All Other Counties

There are no SO_2 sources subject to the DRR in any of the remaining counties in Iowa. The State is recommending that each remaining county in Iowa be designated unclassifiable/attainment.

[11] Iowa DNR, *2010 1-Hour Sulfur Dioxide Standard Designation Recommendations*, Technical Support Document, December 23, 2015

Appendix A. Cargill and Ingredion Source Data

Table A-1. Cargill and Ingredion modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate* (lb/hr)
Cargill		
CEP1	Starch Flash Dryer #3	0.80[A]
CEP32	Carbon Furnace	0.493[A]
CEP40	Mill Aspiration System	0.07[A]
CEP41	Steephouse Aspiration System	0.23[A]
CEP61	Mod House Wet Scrubber	0.003[A]
CEP70	Mod Scrubber	0.003[A]
CEP71	Tank Aspiration	0.002[A]
CEP90	Starch Flash Dryer #4	0.80[A]
CEP100	Gas Boiler	0.13
CEP101	Gas Boiler	0.16
CEP109	Gluten Drum Filter	0.31
CEP116	Starch Spray Dryer	0.31[A]
CEP161	Mod Tank Scrubber	0.001[A]
CEP162	Flash Dryer	0.42
CEP247	Wetbran Conveyor	0.017[A]
CEP248	Slurry Tank #6	0.366[A]
CEP249	East Gluten Filter Vacuum Pump	0.002[A]
CEP250	Middle Gluten Filter Vacuum Pump	0.005[A]
CEP251	West Gluten Filter Vacuum Pump	0.005[A]
CEP252	Slurry Tank #7	0.366[A]
CEP254	Slurry Tank #5	0.366[A]
CEP410	RTO	0.38[A]
CEP450	Slurry Tank #8	0.044
CWETFEED	Wetfeed Fugitives	0.017[A]
CSTPHSE	Steephouse Fugitives	0.12[A]
Ingredion		
PEP015	Dryer #1	0[A]
PEP023	#2 Starch Flash Dryer	0[A]
PEP030	Starch Dryer #3 - North Stack	0[A]
PEP042	Starch Dryer #3 - South Stack	0[A]
PEP106	Main Fermentation Vent	0[A]
PEP109	Distillation	0[A]
PEP122	Vacuum Pump	0[A]
PEP241	Steep & Surge Tanks	0.01[A]
PEP251	Gluten Filters	0.001[A]
PEP255	Gluten Meal Recycle System	0[A]
PEP260	Germ Rotary Tube Dryer #6	2.6[A]
PEP261	#4 Germ Rotary Tube Dryer	0[A]
PEP262	#3 Germ Rotary Tube Dryer	0[A]

Model ID	Unit Description	Modeling Emission Rate* (lb/hr)
PEP263	#2 Germ Rotary Tube Dryer	0 [A]
PEP264	#1 Germ Rotary Tube Dryer	0 [A]
PEP265	B & M Germ Fluidized Bed Predryer	3.98 [A]
PEP271	#6 Gluten Filter Vacuum Pump	0 [A]
PEP275	Gluten Meal Dryer	3.06 [A]
PEP279	Bldg 5 Process Tanks	0.024 [A]
PEP290	Starch Slurry Tanks - Bldg 8	0.006 [A]
PEP437	Vacuum Pump - Dryer #4	0 [A]
PEP458	Dryer #4	0 [A]
PEP477	Treating Tanks 19-39	0.0046 [A]
PEP478	Tanks - Bldg 77 & 96	0.0046 [A]
PEP481	Starch Treating Tanks - Bldg 68	0.0046 [A]
PEP521	Package Boiler #1	0.059 [A]
PEP522	Package Boiler #2	0.059 [A]
PEP524A	Boiler #3	0.02 [A]
PEP752	R&D Scrubber	0 [A]
PEP16E	HSW Railcar - BLDG 16	0.001 [A]
PEP03A	Steephouse Bldg Vent #1	0.04 [A]
PEP03B	Steephouse Bldg Vent #2	0.04 [A]
PEP03C	Steephouse Bldg Vent #3	0.04 [A]
5A_0001	Bldg 5 Vent	0.095
5A_0002	Bldg 5 Vent	0.095
4A_001	Bldg 4 Vent	0.19
16E_1A	Bldg 16 Wet Feed Area Loadout	0.008 [A]
16E_1B	Bldg 16 Wet Feed Area Loadout	0.008 [A]

* Modeled emission rates are the maximum permitted allowable emission rates unless otherwise noted.

[A] Reflects most current reported actual emission rate.

Table A-2. Cargill and Ingredion point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
Cargill							
CEP1	612322.9	4647237.5	219.46	18.29	1.19	314.3	29.40
CEP32	612241.2	4647270.7	219.46	31.70	0.46	379.8	10.39
CEP40	612232.4	4647334.2	220.25	11.89	0.94	307.6	VR
CEP41	612225.3	4647338.7	219.58	21.64	1.22	307.6	9.85
CEP61	612265.5	4647236.3	219.46	18.29	0.25	297.6	6.72
CEP70	612276.0	4647246.5	219.46	19.52	0.25	299.8	12.85
CEP71	612312.5	4647270.6	219.46	21.64	0.41	299.8	10.91
CEP90	612323.6	4647272.9	219.33	25.60	2.21	314.3	10.14
CEP100	612156.3	4647238.0	219.29	47.24	2.74	422.0	5.24
CEP101	612123.7	4647245.9	219.29	8.23	1.40	455.4	27.07
CEP109	612184.8	4647303.7	219.58	15.24	0.95	304.3	10.50

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
CEP116	612038.7	4647338.7	220.10	34.75	1.02	365.0	30.38
CEP161	611997.0	4647309.3	220.00	12.80	0.30	305.4	11.64
CEP162	611995.4	4647299.0	219.97	36.80	1.96	322.0	9.47
CEP247	612085.5	4647300.1	220.49	20.42	0.20	333.2	0.36
CEP248	612026.9	4647349.9	219.46	17.98	0.25	316.5	VR
CEP249	612191.6	4647290.6	219.58	10.97	0.23	302.6	1.91
CEP250	612189.0	4647291.1	219.58	10.97	0.25	302.6	3.76
CEP251	612187.0	4647291.5	219.58	10.97	0.25	302.6	4.36
CEP252	612012.6	4647366.5	219.46	17.37	0.25	322.0	VR
CEP254	612068.9	4647363.7	220.83	14.94	0.25	316.5	VR
CEP410	612230.2	4647276.6	219.94	35.97	1.73	408.2	9.67
CEP450	612026.9	4647321.5	219.46	35.05	0.25	322.0	14.33
Ingredion							
PEP015	610587.3	4647206	217.14	34.69	1.27	318.2	19.64
PEP023	610556.4	4647234	217.36	36.06	2.03	320.9	8.88
PEP030	610583.3	4647227	216.99	30.33	1.52	324.3	12.58
PEP042	610590.3	4647210	217.06	30.85	1.32	315.9	7.87
PEP106	610567.1	4647174	217.67	24.38	0.46	194.3	16.96
PEP109	610514.7	4647178	218.24	21.76	0.08	283.2	6.21
PEP122	610473.3	4647312	218.85	19.51	0.08	322.0	7.24
PEP241	610448.8	4647157	219.31	24.14	1.07	299.8	11.09
PEP251	610409.2	4647180	219.80	20.09	0.61	295.9	24.26
PEP255	610402	4647179	219.91	17.37	0.27	355.4	5.83
PEP260	610447	4647178	219.34	20.73	0.91	349.8	10.13
PEP261	610441	4647185	219.43	20.76	0.71	310.9	5.94
PEP262	610442	4647181	219.41	20.76	0.71	349.8	5.94
PEP263	610444	4647178	219.39	20.76	0.71	349.8	5.94
PEP264	610448	4647172	219.32	20.76	0.71	349.8	5.94
PEP265	610422	4647168	219.52	27.71	1.52	337.0	12.48
PEP271	610408	4647166	219.81	15.85	0.13	320.9	33.79
PEP275	610379	4647180	220.09	35.66	1.45	323.7	14.12
PEP279	610420.3	4647156	219.60	18.75	0.71	308.2	8.32
PEP290	610497.1	4646998	220.59	11.28	0.46	310.9	VR
PEP437	610552.3	4646997	219.21	22.25	0.22	320.9	7.73
PEP458	610574.8	4647021	218.61	39.20	1.83	322.0	8.88
PEP477	610554.5	4647020	218.85	22.98	0.36	310.9	16.63
PEP478	610612.5	4647039	219.10	11.89	0.41	310.9	7.25
PEP481	610527.8	4647007	219.34	21.64	0.51	310.9	4.66
PEP521	610497.3	4647347	218.60	42.37	1.37	422.0	9.71
PEP522	610486.3	4647341	218.94	42.37	1.37	422.0	9.71
PEP524A	610501.7	4647328	218.05	6.10	1.82	572.0	6.53
PEP752	610270	4647132	221.75	9.14	0.20	294.3	11.64
PEP16E	610468.2	4647250.8	218.85	4.57	0.61	349.8	VR

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
PEP03A	610438.5	4647121.7	219.89	26.52	0.46	305.4	8.62
PEP03B	610445.2	4647108.7	219.84	26.52	0.46	305.4	8.62
PEP03C	610437.2	4647112.7	219.77	22.86	0.89	305.4	VR

Table A-3. Cargill and Ingredion volume source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Release Height (m)	Initial Lateral Dimension* (m)	Initial Vertical Dimension* (m)
Cargill						
CWETFEED	612074.3	4647323.1	220.51	10.59	5.50	9.85
CSTPHSE	612190.7	4647342.0	221.02	8.56	13.48	7.97
Ingredion						
5A_0001	610395.1	4647162.2	220.08	7.54	6.94	7.02
5A_0002	610406.7	4647168.0	219.84	7.54	6.94	7.02
4A_001	610437	4647157	219.44	5.56	6.61	6.10
16E_1A	610502.4	4647239.7	218.39	5.33	5.43	4.96
16E_1B	610498.4	4647248.1	218.41	5.33	5.43	4.96

*Dimensions based on building where located unless otherwise specified.

Appendix B. OPPD North Omaha Source Data

Table B-1. OPPD North Omaha modeled SO_2 emission rates.

Model ID	Unit Description	Modeling Emission Rate (lb/hr)
OPPDB	Boiler #4	Variable Actual Hourly (CEMS)
OPPDC	Boiler #5	Variable Actual Hourly (CEMS)

Table B-2. OPPD North Omaha point source exhaust characteristics.

Model ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
OPPDB	253421.4	4579505.2	303.58	62.18	2.93	422.0	36.88
OPPDC	253401.9	4579524.4	303.58	62.18	3.51	422.0	36.58

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 3/22/2017 9:43:02 PM
Subject: RE: 1-hr SO2 modeling domain for Whelan
removed.txt

Lance:

I'll take a quick look, but I probably have to ask Ed Liebsch at HDR for clarification. They put together the hourly emissions file

using the CAMD data. I've worked with that site a few times, and it's not an intuitively obvious site to use, although it does have a lot

of thoughtful work that went into it.

I'll try to contact you tomorrow to check if you have some time to chat about this.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 2:54 PM
To: Wiese, Carrie; Alam, Lisa
Subject: RE: 1-hr SO2 modeling domain for Whelan

Hi Carrie,

Right, there is a 2 and a half month period from Oct-Dec, 2014 where the CEMS emissions data from the Clean Air Market Database (CAMD) is consistently greater than the model emissions rate. I attached the 2014 data in the spreadsheet with a time series plot highlighting the time period.

All other hourly modeled inputs for the 3-yr timeframe look to match up well with CAMD, so that is good. But with the source modeling near the level of NAAQS, any clarifying information on the discrepancy during the highlighted two month time frame in 2014 would be greatly appreciated.

Thanks!

Lance

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Wednesday, March 22, 2017 1:21 PM
To: Avey, Lance <Avey.Lance@epa.gov>; lisa.alam@nebraska.gov
Subject: RE: 1-hr SO2 modeling domain for Whelan

Hi Lance,

I also had a voice mail from David Peter, in which he mentioned a several-month period in 2014 for which the CAMD data differed from what was used in modeling, and seeking clarification on that. Can you let us know what time period is in question so we may investigate the discrepancy and report back on that as well?

Thank you!

-Carrie

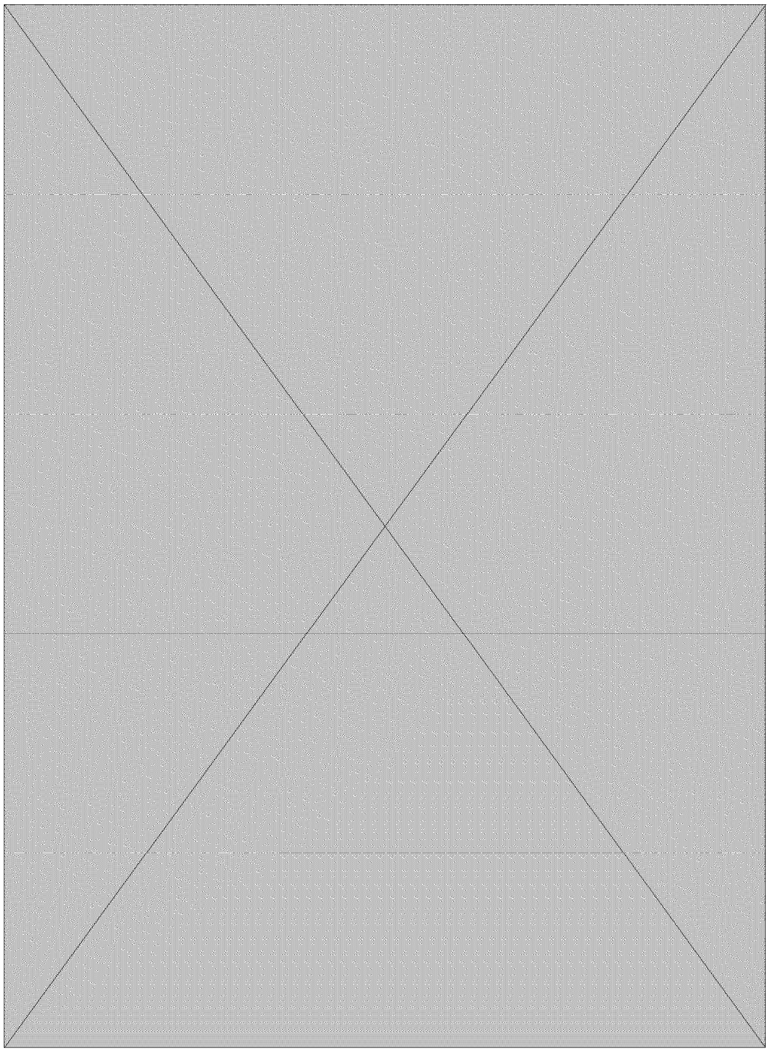
From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 10:21 AM
To: Alam, Lisa
Cc: Wiese, Carrie
Subject: 1-hr SO2 modeling domain for Whelan

Hi Lisa,

Do you know if HDR provided modeling results for the entire modeling receptor grid for Whelan that they proposed in the protocol? You can see the receptor grid that was submitted in the January modeling demonstration is a subset of the proposed grid in the July protocol. It would be nice to verify that no modeling issues occurred beyond the small receptor grid (~5 km) provided in the January submitted demonstration:

Protocol receptor grid:

Submitted receptor grid:



Thanks!

Lance

************************* ATTACHMENT REMOVED *************************

This message contained an attachment which the administrator has caused to be removed.

************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 3/22/2017 6:54:33 PM
Subject: RE: 1-hr SO2 modeling domain for Whelan

Lance:

OK fine.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 1:00 PM
To: Alam, Lisa
Subject: RE: 1-hr SO2 modeling domain for Whelan

Not at this point…just seeing maybe if HDR had a modeling run with results with an slightly expanded grid easily available. So if re-modeling out to 10-km (and I do believe the modeling will be ok out to 10-km) is a heavy lift, lets hold off.

Thanks

Lance

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]

Sent: Wednesday, March 22, 2017 12:51 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-hr SO2 modeling domain for Whelan

Good point. Do you believe the model needs to be re-run, with an increased receptor grid?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 12:45 PM
To: Alam, Lisa
Subject: RE: 1-hr SO2 modeling domain for Whelan

Hi Lisa,

I agree on PGS impacts and the distance from Whelan, so lets not worry about PGS. I guess what would be nice is if the domain went out to 10-km around Whelan, as you can see the AGP facility is about 1-km from the domain edge, and cumulative impacts from Whelan and AGP might extend beyond the current grid. So if we could verify the modeling looks ok out to 10 km around Whelan, that would be encouraging.

Please let me know of any more questions,

Thanks much,

Lance

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, March 22, 2017 12:38 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-hr SO2 modeling domain for Whelan

Lance:

HDR did not send the receptor grid for Whelan that they proposed in the protocol. In the protocol, the receptor grid extended 30 km north from Whelan, to include PGS in Whelan's SO2 SIP model. I was attempting to coax HDR to model as many 1-hour SO2 "SIP facilities" as possible in a single SIP model, and that is why I included PGS in Whelan's modeling as a nearby, in case PGS might later be identified as a "Round 3" SIP modeling objective.

PGS is over 30 km away from Whelan, and putting receptors out to 30 km in Whelan's model is a little excessive.

If PGS is required to model 1-hour SO2, Whelan's model can't be used to say PGS will not violated the NAAQS, which is disappointing, but I will learn to live with that.

Focusing only on Whelan, it's a solid modeling demonstration, and at 30 km away, PGS will not cause a significant impact gradient with Whelan's predicted impacts.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 10:21 AM
To: Alam, Lisa
Cc: Wiese, Carrie
Subject: 1-hr SO2 modeling domain for Whelan

Hi Lisa,

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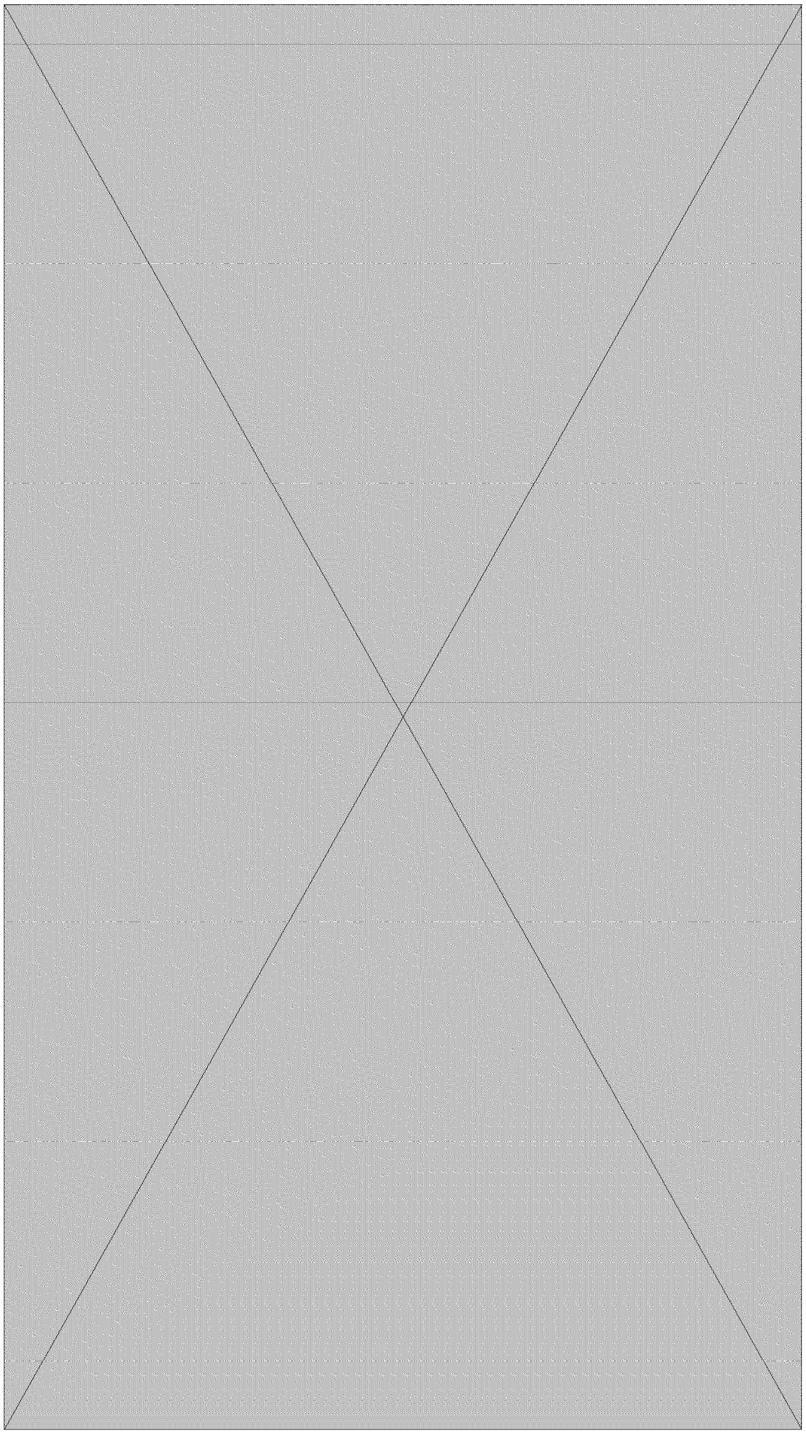
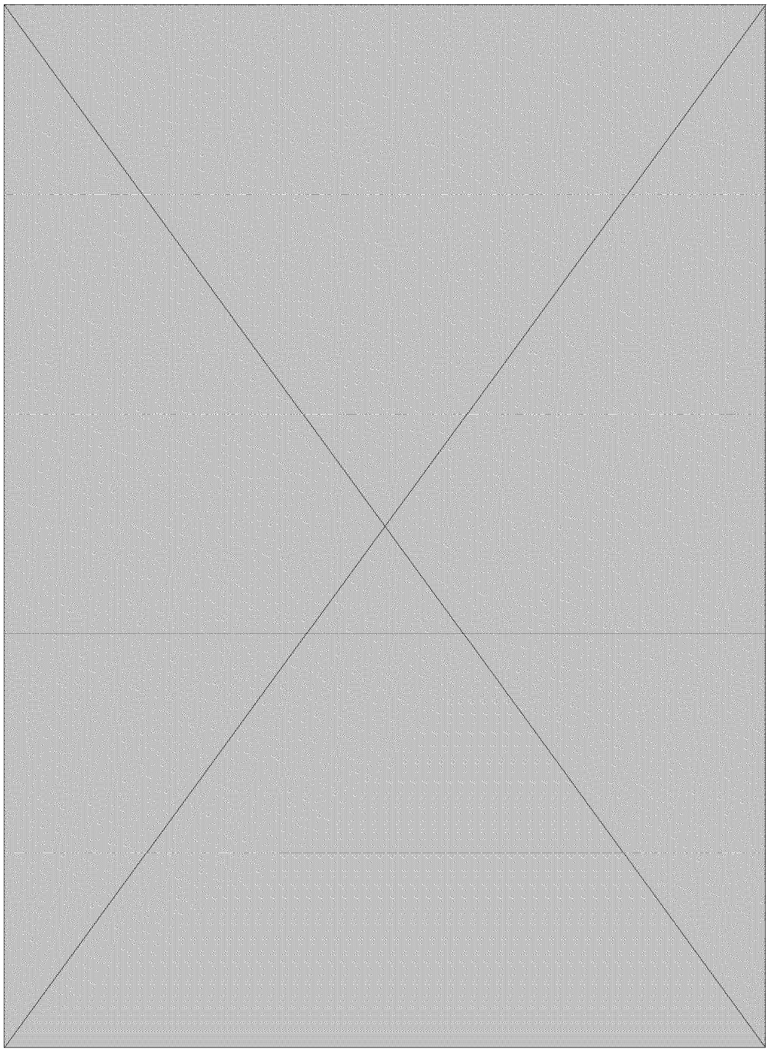
Protocol receptor grid:



Submitted receptor grid:



Thanks!

Lance

To: Avey, Lance[Avey.Lance@epa.gov]; lisa.alam@nebraska.gov[lisa.alam@nebraska.gov]
From: Wiese, Carrie
Sent: Wed 3/22/2017 6:21:14 PM
Subject: RE: 1-hr SO2 modeling domain for Whelan
removed.txt

Hi Lance,

I also had a voice mail from David Peter, in which he mentioned a several-month period in 2014 for which the CAMD data differed from what was used in modeling, and seeking clarification on that. Can you let us know what time period is in question so we may investigate the discrepancy and report back on that as well?

Thank you!

-Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
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To: Alam, Lisa
Cc: Wiese, Carrie
Subject: 1-hr SO2 modeling domain for Whelan

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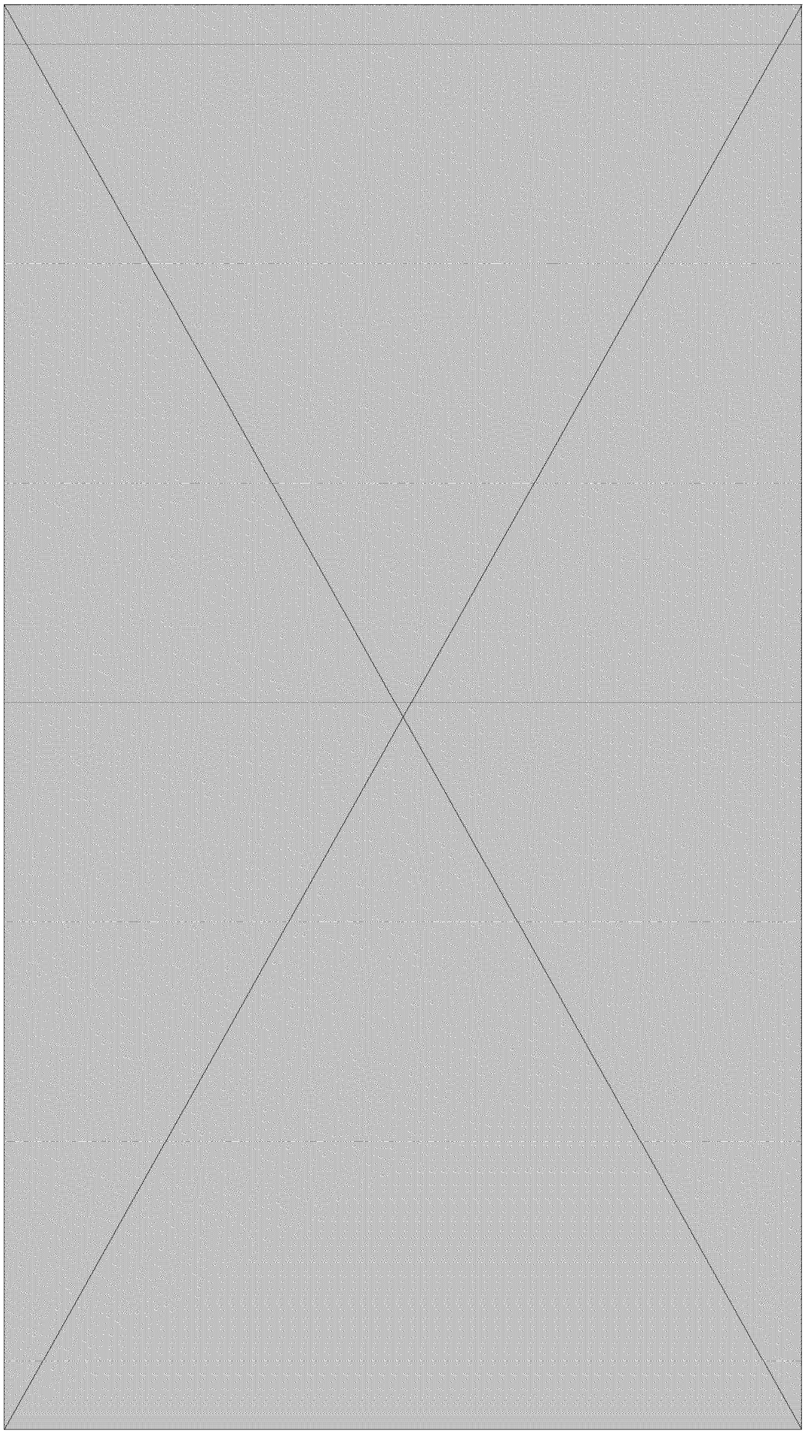
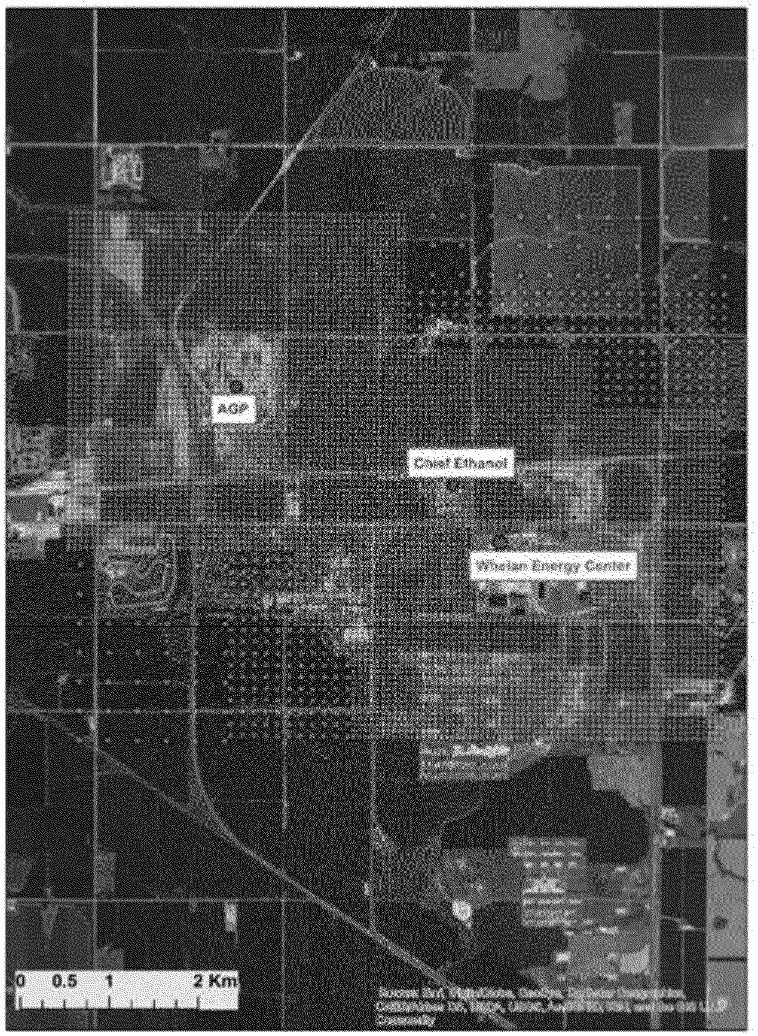


Submitted receptor grid:



Thanks!

Lance

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************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 3/22/2017 5:50:59 PM
Subject: RE: 1-hr SO2 modeling domain for Whelan
removed.txt

Good point. Do you believe the model needs to be re-run, with an increased receptor grid?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

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Sent: Wednesday, March 22, 2017 12:45 PM
To: Alam, Lisa
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Please let me know of any more questions,

Thanks much,

Lance

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Sent: Wednesday, March 22, 2017 12:38 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-hr SO2 modeling domain for Whelan

Lance:

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****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

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From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, March 22, 2017 10:21 AM
To: Alam, Lisa
Cc: Wiese, Carrie
Subject: 1-hr SO2 modeling domain for Whelan

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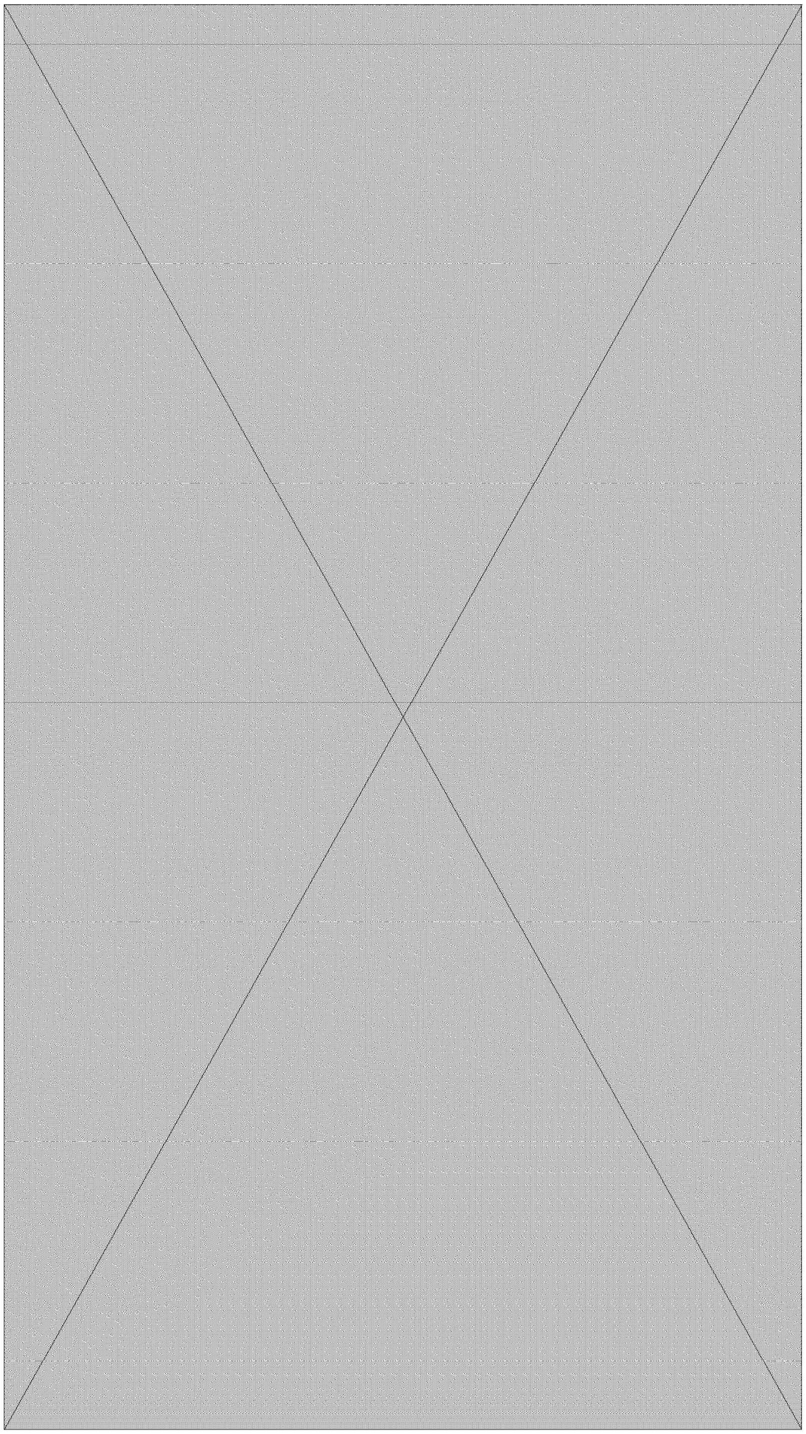
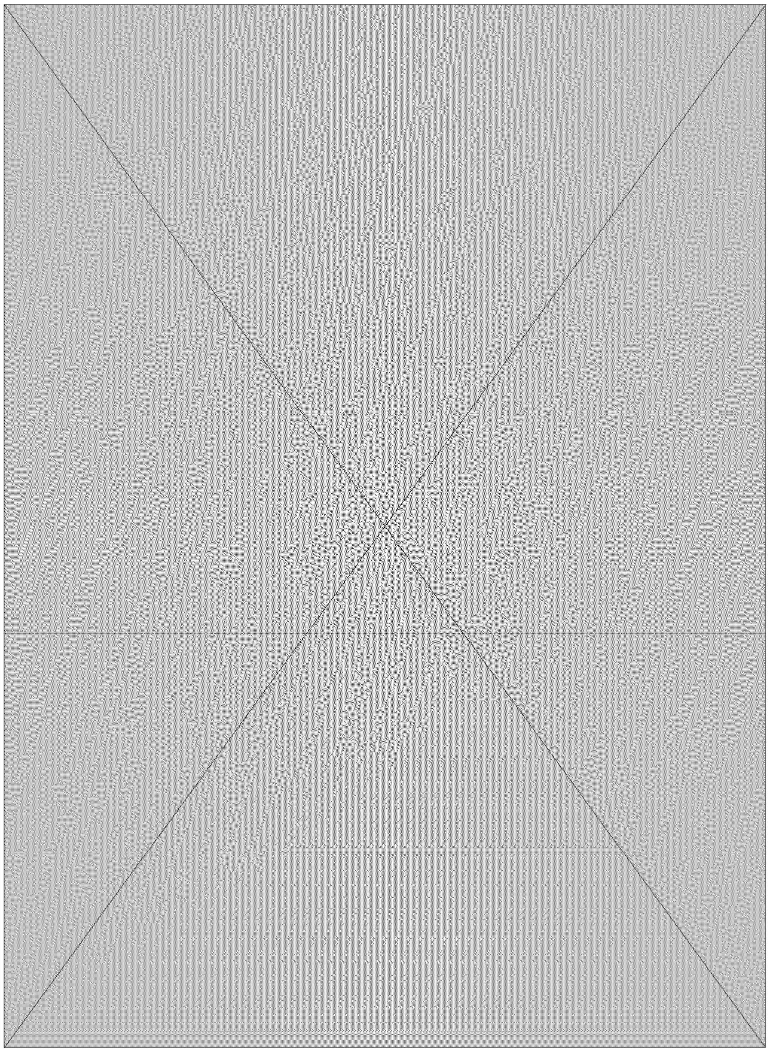


Submitted receptor grid:



Thanks!

Lance

To: Avey, Lance[Avey.Lance@epa.gov]
From: Wiese, Carrie
Sent: Thur 12/1/2016 4:17:09 PM
Subject: RE: Whelan modeling protocol

OK, thanks Lance!

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, December 01, 2016 10:16 AM
To: Wiese, Carrie
Subject: RE: Whelan modeling protocol

Hi Carrie,

Sorry for the late reply. We consider the modeling protocols living documents, and no formal approval is provided for the DRR protocols. However, I did not see any show-stopping issues in the provided Whelan protocol, and I gave some brief comments on it to Lisa back in July. So feel free to check in on the consultant on the progress.

Thanks for checking in on the Whelan modeling!

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Tuesday, November 29, 2016 3:05 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: Whelan modeling protocol

Good afternoon, Lance:

I was about to send a message to the consultant working with the Whelan Energy Center to see how they're doing with the modeling for the SO2 DRR, and realized we hadn't heard for sure that their modeling protocol was approved. Is everything in order with that?

Thanks so much!

Carrie

Carrie Wiese

Carrie Wiese

Supervisor – Air Quality Grants, Planning and Outreach Unit

Nebraska Department of Environmental Quality

1200 N Street, Suite 400

Lincoln, NE 68508

(402)471-6624, carrie.wiese@nebraska.gov

To: Avey, Lance[Avey.Lance@epa.gov]
From: Wiese, Carrie
Sent: Tue 11/29/2016 9:05:22 PM
Subject: Whelan modeling protocol

Good afternoon, Lance:

I was about to send a message to the consultant working with the Whelan Energy Center to see how they're doing with the modeling for the SO2 DRR, and realized we hadn't heard for sure that their modeling protocol was approved. Is everything in order with that?

Thanks so much!

Carrie

Carrie Wiese

Carrie Wiese

Supervisor – Air Quality Grants, Planning and Outreach Unit

Nebraska Department of Environmental Quality

1200 N Street, Suite 400

Lincoln, NE 68508

(402)471-6624, carrie.wiese@nebraska.gov

To: Avey, Lance[Avey.Lance@epa.gov]
From: Wiese, Carrie
Sent: Tue 11/15/2016 10:38:58 PM
Subject: Draft attachment for North Omaha
NR050316 Att F for North Omaha Station (updated November 2016).docx

Hi Lance,

I was wondering if you would take a look at the revised attachment concerning monitoring at North Omaha, particularly on the section related to modeling and the site determination, to let me know if you feel this is accurate and meets needs concerning the DRR. I'll be sharing this with Jim Yeggy once I've gotten your OK so we can finalize our materials and then forward along to Amy and Leland while we're preparing to post them to our website for public notice.

Thanks!
Carrie

Carrie Wiese

Carrie Wiese

Supervisor – Air Quality Grants, Planning and Outreach Unit

Nebraska Department of Environmental Quality

1200 N Street, Suite 400

Lincoln, NE 68508

(402)471-6624, carrie.wiese@nebraska.gov

Introduction

On August 21, 2015 EPA finalized changes to 40 CFR Part 51 Subpart BB, §51.1200 - §51.1205 (a.k.a. the Data Requirements Rule or DRR). The DRR requires air agencies to provide data to characterize current air quality in areas surrounding sources of SO_2 emitting 2,000 tpy or more, to identify maximum 1-hour concentrations of SO_2 in ambient air. To address these requirements, air agencies may either submit modeling or monitoring data in the areas of DRR-affected sources, or assign permit limits to these sources. Omaha Public Power District (OPPD)'s North Omaha Station in Omaha, NE is one of the DRR-affected sources for which NDEQ proposes to submit monitoring data to satisfy the requirements of the DRR.

Site Selection

Emission Sources

The main major SO_2 emission sources in the vicinity of North Omaha Station are the Station itself, Eppley Airfield in Omaha, and Mid-American's Walter Scott Energy Center in Council Bluffs, IA. North Omaha Station has historically been a coal-fired electrical generating unit (EGU), and is capable of generating approximately 650 megawatts of electricity.

Based on annual Acid Rain Program data over the past 10 years, North Omaha Station's total SO_2 emissions (for Units 1 through 5) have ranged from approximately 10,500 tpy to 15,000 tpy with the average being approximately 13,000 tpy. For 2015, the total SO_2 emissions for all units were 13,892 tons. Figure F-1 shows these data, demonstrating an overall downward trend in SO_2 emissions.

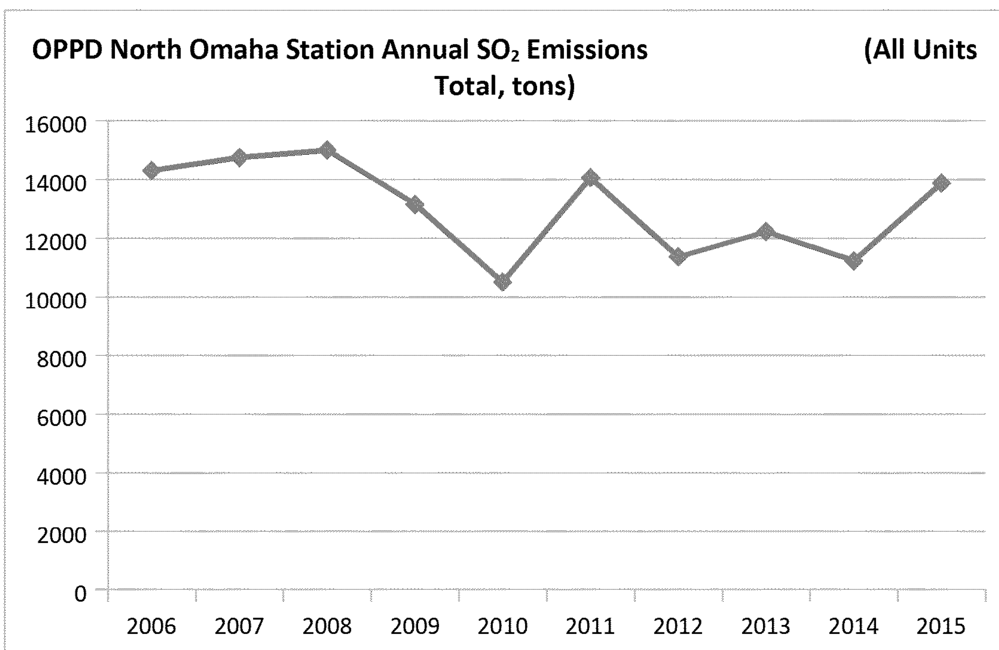


Figure F-1: OPPD North Omaha Station Annual SO_2 Emissions

Quarterly Acid Rain Program data from the past 10 years indicate that, in general with few exceptions, the highest SO_2 emissions from the facility occur during the 3rd quarter and sometimes 4th quarter. This is to be expected during the hottest months of the year due to increased demand on power stations for cooling needs. Figure F-2 demonstrates these trends.

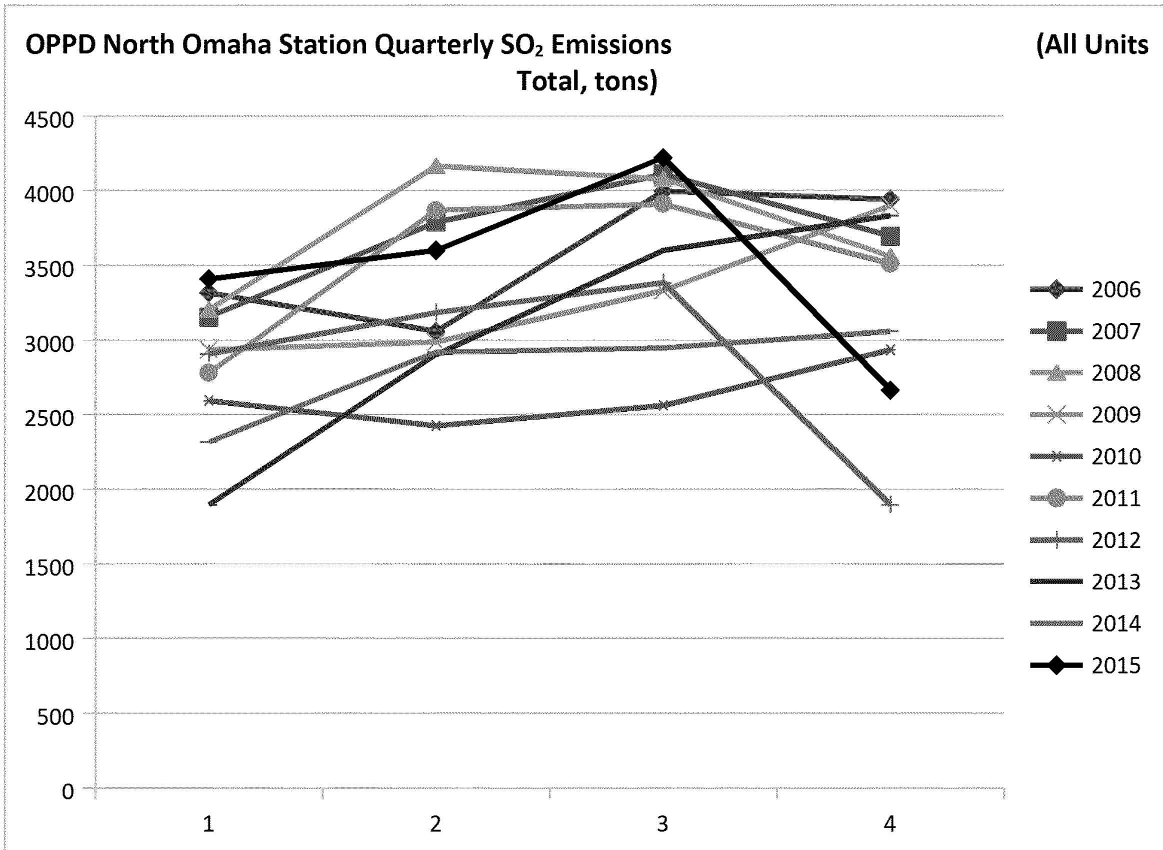


Figure F-2: OPPD North Omaha Station Quarterly SO_2 Emissions

In 2014, the OPPD board of directors approved a plan to retire three of the five coal-burning units at North Omaha Station, and to install emissions controls on the remaining two units which will be refueled in 2023 with natural gas. OPPD ceased coal operation of the first three coal-burning units in April 2016 (these units are still capable of firing natural gas); these three units accounted for approximately 47% of the facility's annual SO_2 emissions, on average, while burning coal.

Existing Air Quality Data

Due to existing SO_2 monitors in the Omaha area, including the Whitmore monitor, data are available to characterize air quality with respect to SO_2 for an extended period of time. As demonstrated in Figure F-3, excerpted from NDEQ's *2015 Ambient Air Monitoring Network Plan & Assessment*, there is a significant overall downward trend in maximum annual average SO_2 in the Omaha MSA since measurement collection began, and also a significant decline in the range of maximum annual values in more recent years.

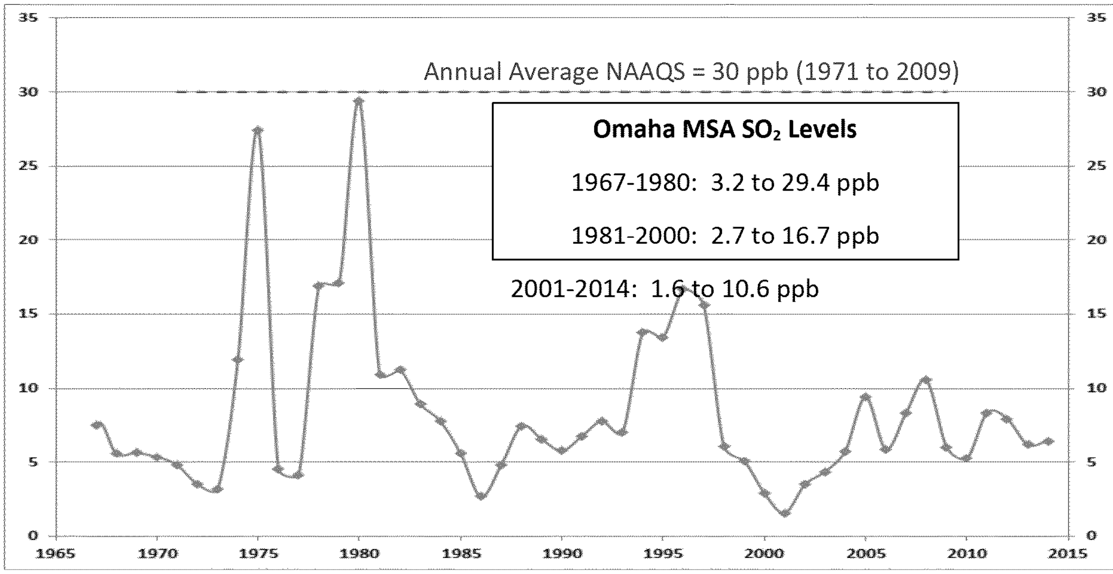


Figure F-3: Maximum Annual Average SO2 in Omaha MSA: 1967-2014

As demonstrated in Figure F-4, the Whitmore monitor has recorded an overall downward trend in annual 99th percentile SO_2 values since 2006, as well as declines in the three-year design values. No design values have exceeded the 2010 1-hour SO_2 NAAQS since 2009.

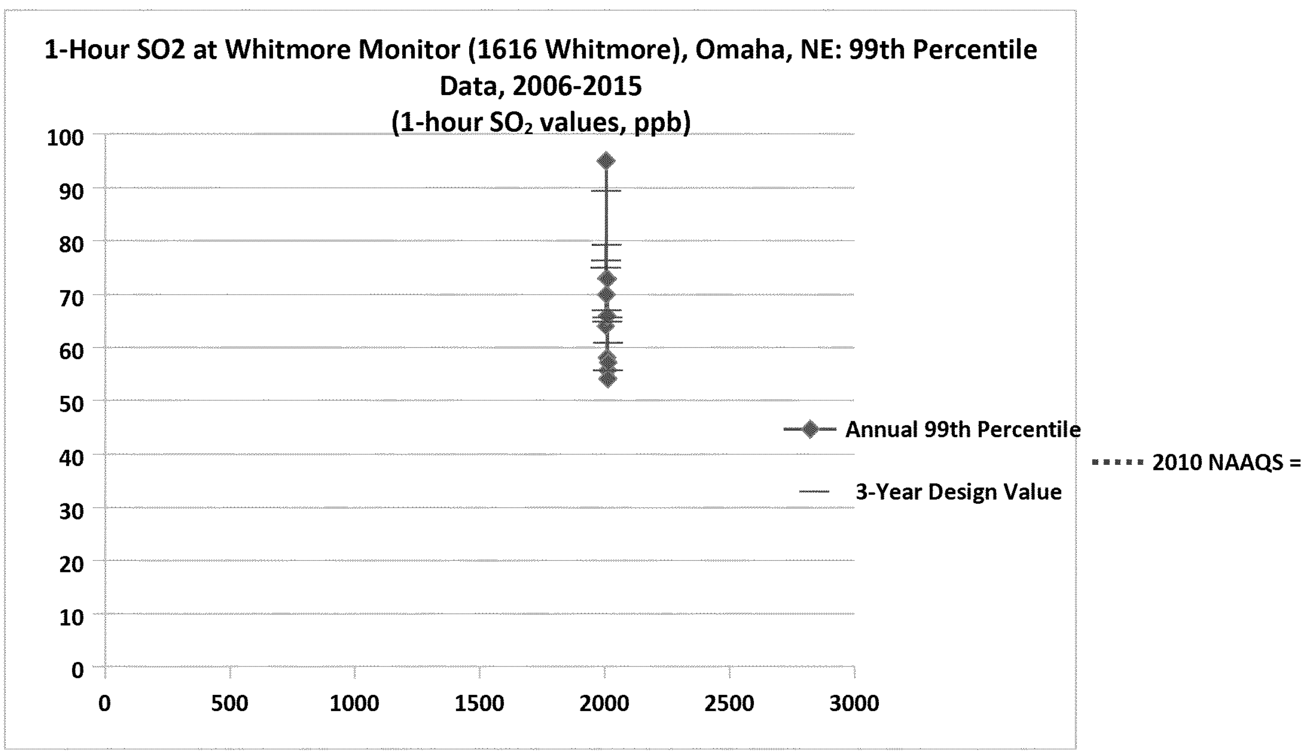


Figure F-4: 99th Percentile and Design Values of 1-hour SO_2 at Whitmore Monitor, 2006-2015

Modeling and Studies

A 1997 University of Nebraska master's thesis (*Examination of SO_2 Ambient Air Monitoring Location Using Air Dispersion Modeling* by Eitan Tsabari) examined SO_2 concentrations in the north Omaha area and the use of an air dispersion model to appropriately identify monitoring locations. The study identified the highest 1-hour SO_2 concentrations to the southeast of North Omaha Station, and modeled SO_2 concentrations (while consistently higher than measured concentrations) also fell within this area.

NDEQ conducted AERMOD modeling in June 2016 in support of considering monitor placement for North Omaha Station for DRR purposes. This more recent modeling indicates the highest average 1-hour SO_2 concentrations fall to the southeast and west of North Omaha Station, as indicated in Figure F-5.

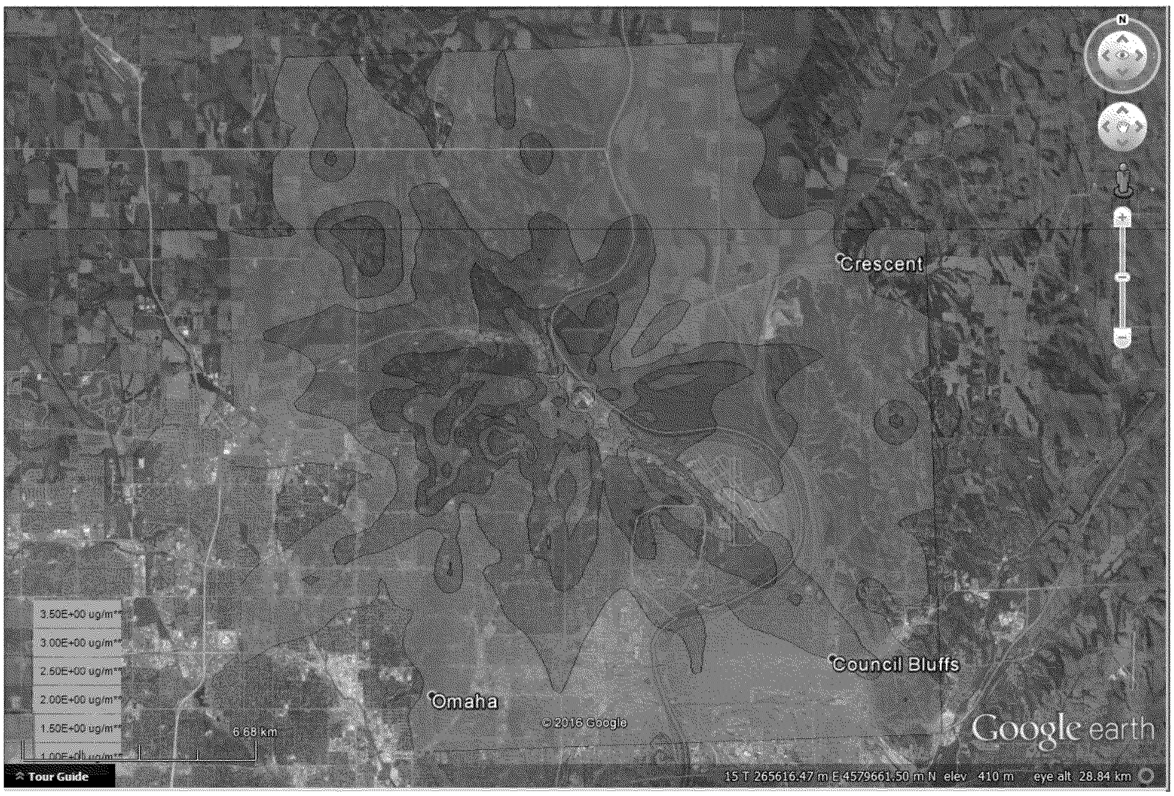


Figure F-5: NDEQ-modeled First-high Average 1-hour SO_2 Concentrations, 2016

Following original submission of the network monitoring plan (and this attachment) to EPA on June 29, 2016, NDEQ and the Iowa Department of Natural Resources (IDNR) were contacted by EPA and requested to consider impacts from the Walter Scott Energy Center (approx. 19 km southeast) on North Omaha Station and vice versa, in part to consider whether the two sources should use the same data characterization method per the DRR, being in the same "area". IDNR produced modeling that demonstrated the impacts of emissions from North Omaha Station were not reciprocal to impacts from the Walter Scott Energy Center on North Omaha Station, and that attainment around the Walter Scott Energy Center would best be characterized through modeling, while attainment surrounding North Omaha Station could effectively be characterized through monitoring. EPA also requested additional modeling from NDEQ to further analyze the impacts of the Walter Scott Energy Center around North Omaha Station for purposes of monitor placement, and produce a ranking analysis similar to that found in the Georgia Department of Natural Resources 2016 Ambient Air Monitoring Plan. The dispersion modeling was conducted in cooperation with EPA Region 7 staff, through approved protocols.

The MAXDAILY output file produced by AERMOD was analyzed sing Excel spreadsheet formulae to determine, for each modeled day of meteorology, the receptor with the maximum 1-hour SO2 concentration on that day. From this, the 100 receptors were ranked (Table F-1 and Figure F-6).

Table F-1: Receptor Ranking from NDEQ/EPA Modeling around North Omaha Station

location (UTM)	max freq count	4th max concentration	Count rank	Fourth rank	total_score (count_rank + fourth_rank)
253661.1 4580764.4	4	3.60068	65	164	229
250911.1 4578514.4	6	3.01916	47	182	229
253090.9 4579683.8	1	7.90919	174	54	228
247911.1 4581014.4	2	5.43359	116	110	226
252411.1 4578764.4	2	5.5969	116	106	222
253661.1 4578264.4	1	8.44074	174	46	220
252911.1 4580264.4	5	3.55149	53	167	220
251911.1 4580264.4	1	8.61063	174	45	219
251661.1 4581764.4	1	8.63094	174	44	218
249911.1 4584014.4	1	8.6461	174	43	217
251911.1 4578014.4	4	3.92929	65	150	215
254161.1 4580014.4	3	4.96206	89	125	214
251661.1 4578764.4	1	9.04993	174	36	210
253056 4580098.5	3	5.08667	89	121	210
253778 4579345.2	2	6.01046	116	93	209
251911.1 4577764.4	3	5.1654	89	119	208
250911.1 4586264.4	2	6.12349	116	90	206

250661.1 4582514.4	1	9.27907	174	31	205
250911.1 4583764.4	1	9.29149	174	30	204
252161.1 4578264.4	1	9.57256	174	28	202
253072.1 4579782	2	6.23888	116	85	201
253649.8 4579068.3	2	6.26343	116	84	200
249411.1 4582764.4	1	9.7304	174	25	199
253911.1 4578514.4	5	4.3059	53	146	199
248161.1 4580514.4	2	6.42779	116	81	197
253411.1 4578264.4	2	6.48141	116	80	196
252161.1 4577764.4	2	6.52924	116	79	195
253745.4 4579494.9	3	5.63415	89	105	194
252661.1 4579764.4	2	6.66788	116	74	190
248411.1 4582014.4	1	10.67337	174	15	189
253670.1 4579560.7	2	6.72931	116	71	187
253661.1 4579014.4	2	6.82083	116	69	185
253081.5 4579732.9	2	6.92502	116	67	183
253161.1 4578514.4	7	4.40795	37	143	180
253181.1 4579988.9	3	6.18878	89	87	176
253911.1 4578764.4	10	3.85841	22	154	176
253444.4 4579758.4	2	8.17908	116	49	165
253100.2 4579634.7	2	8.35747	116	48	164
248661.1 4582014.4	3	6.65851	89	75	164
249911.1 4585764.4	2	8.37373	116	47	163
253911.1 4580014.4	7	5.0618	37	124	161
250161.1 4579264.4	2	8.92528	116	40	156
252911.1 4579514.4	2	8.93183	116	39	155
251161.1	3	7.1286	89	66	155

4578514.4					
250161.1 4585014.4	2	9.00141	116	37	153
252661.1 4579014.4	3	7.20133	89	64	153
253557.3 4579659.5	3	7.55158	89	61	150
253661.1 4580014.4	6	5.67643	47	103	150
253411.1 4580514.4	4	6.28314	65	83	148
253411.1 4578514.4	3	7.82657	89	56	145
253661.1 4580514.4	6	5.84887	47	98	145
250161.1 4583014.4	2	9.67187	116	26	142
253594.9 4579626.6	4	6.63399	65	76	141
250411.1 4581764.4	2	9.85925	116	24	140
253911.1 4580264.4	7	5.74945	37	100	137
253248.1 4579237	4	6.79289	65	70	135
253692.4 4579094.4	7	5.85256	37	97	134
253109.6 4579585.5	3	8.65345	89	42	131
253283.4 4579201.5	4	7.14351	65	65	130
252411.1 4579514.4	4	7.93854	65	53	118
252911.1 4579014.4	5	7.30569	53	63	116
253119 4579536.4	4	8.14088	65	50	115
253353.8 4579130.6	5	7.71737	53	58	111
252911.1 4579264.4	5	7.90059	53	55	108
250411.1 4582014.4	3	10.74439	89	14	103
249911.1 4583014.4	4	9.10055	65	33	98
253256.3 4579923.1	7	8.04318	37	52	89
253389.1 4579095.1	4	9.94604	65	20	85
253411.1 4580014.4	5	9.15268	53	32	85
251411.1					

4581764.4					
253218.7 4579956	10	7.55485	22	60	82
253161.1 4580264.4	16	6.68595	8	72	80
251411.1 4580264.4	4	10.9018	65	13	78
253607.2 4579042.2	7	8.78206	37	41	78
251661.1 4582014.4	4	11.57316	65	11	76
253409.2 4579074.8	4	11.61527	65	10	75
253632.5 4579593.7	6	9.64629	47	27	74
253430.4 4579071.8	4	13.01129	65	6	71
253406.8 4579791.3	6	10.45729	47	18	65
253161.1 4580514.4	20	7.55502	5	59	64
253411.1 4579014.4	5	11.80037	53	9	62
251911.1 4580514.4	5	11.94383	53	8	61
253661.1 4580264.4	24	7.73063	3	57	60
253411.1 4578764.4	7	9.92953	37	21	58
253519.7 4579692.5	10	9.07595	22	34	56
253661.1 4578514.4	11	8.97698	18	38	56
253411.1 4580264.4	37	8.11045	1	51	52
253661.1 4578764.4	17	9.06968	7	35	42
253294 4579890.1	10	10.13393	22	19	41
252661.1 4579514.4	11	9.90786	18	22	40
253161.1 4578764.4	15	9.4022	10	29	39
253494.8 4578973.3	8	13.9279	33	3	36
253431.9 4579071.6	9	13.20433	29	5	34
253485 4578988.7	9	14.03447	29	2	31
253161.1 4579014.4	16	9.86968	8	23	31
253564.5 4579016	10	12.36971	22	7	29

253331.6 4579857.2	15	10.669	10	16	26
253458 4579030.8	10	14.25943	22	1	23
253369.2 4579824.2	21	11.51426	4	12	16
253521.9 4578989.9	19	13.32461	6	4	10

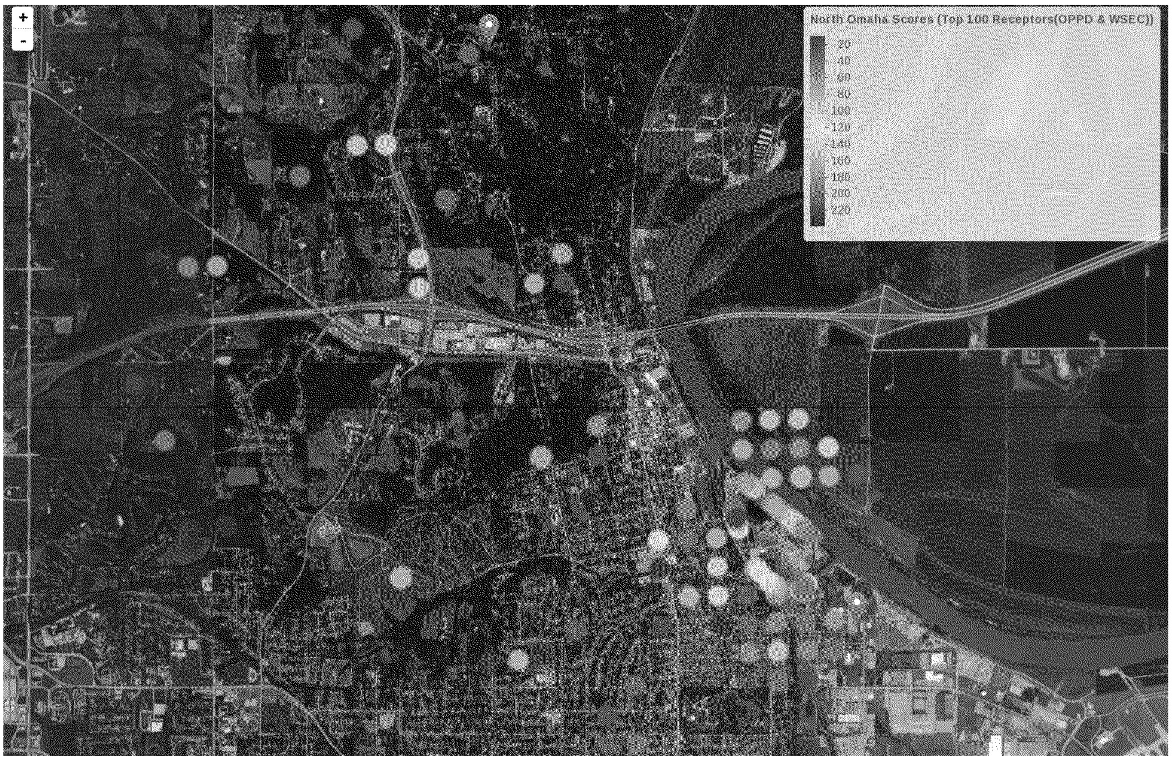


Figure F-6: Top 100 Receptor Locations Surrounding North Omaha Station

As or
alo e
pro

Me
As
indicate general prevalent wind direction in the area as NW/NNW or S/SSE.

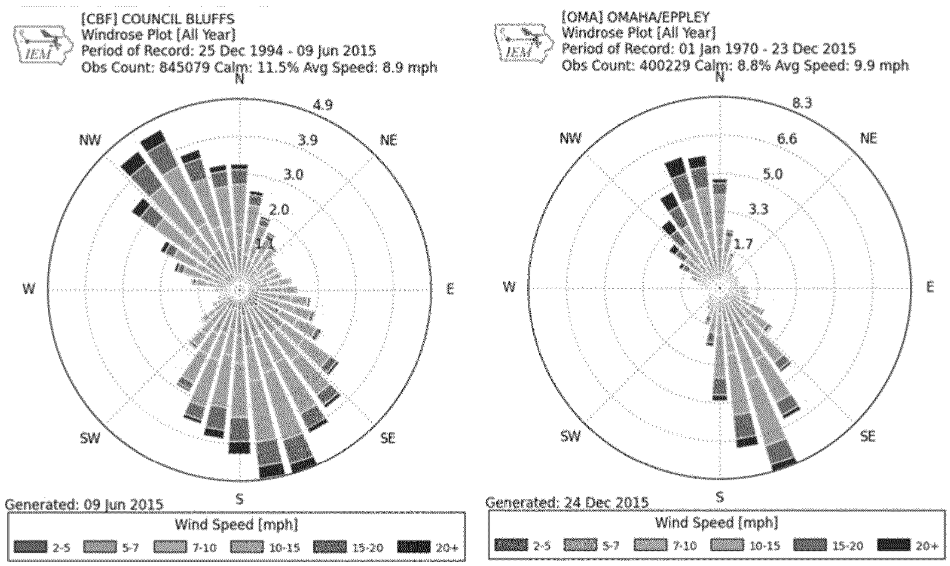


Figure F-7: Omaha Area Wind Roses

Geographic Influences

As indicated in Figure F-6, much of the area south of OPPD's North Omaha Station consists of metropolitan development, while much of the area north and west of North Omaha Station is wooded or farmland. It should be noted that an SO_2 monitor was previously placed in the wooded area north of North Omaha Station, but was decommissioned in 2010 due to consistently low recordings; it is likely that this monitor was impacted by tree canopy.

Site Determination

Through the additional modeling conducted by NDEQ and EPA Region 7 staff, NDEQ was able to narrow down a proposed site location. Installation of a monitor in or along the Missouri River would be infeasible, as would installation of a monitor within residential neighborhoods or in wooded areas. The remaining most feasible location is in the vicinity of the ballfields/parking area immediately south of the power plant, along John J. Pershing Drive. This is the proposed monitoring location (Figure F-8).

EPA Region 7 staff visited the site on November 9, 2016 and confirmed there were no concerns with the location in terms of interference from the roadway or rail line, and that it was appropriately placed to monitor the most feasible area of highest impact as indicated by the cluster of receptors as shown in Figure F-6.

Figure F-8: Proposed DRR Monitoring Location for North Omaha Station

The proposed site is fairly level with no trees or other major concerns for placement of the monitor and supporting equipment. Figure F-9 provides photos of the proposed site and its surroundings.

Figure F-9: Photos of Proposed DRR Monitoring Location for North Omaha Station

1. From proposed site, looking north toward North Omaha Station

2. From proposed site, looking east

Figure F-9 (cont'd): Photos of Proposed DRR Monitoring Location for North Omaha Station

3. From proposed site, looking south toward John J. Pershing Drive

4. From proposed site, looking west

Because the existing Whitmore monitoring site was placed specifically to capture SO_2 readings from North Omaha Station in an economically disadvantaged area for environmental justice purposes, the NDEQ feels that Whitmore and this single additional proposed monitoring location will satisfy DRR needs. Further, given the expected drastic reduction and possible near-elimination of SO_2 emissions from this facility (given halted operation with coal of Units 1-3 and impending conversion of Units 4 and 5 to natural gas in the coming years), NDEQ feels that additional investment in installing monitors for this source would be an unwise expenditure of limited funding and resources.

NDEQ will provide a trailer to house the monitor and supporting equipment, while the Douglas County Health Department will provide the monitor and supporting equipment. OPPD will provide electricity and fencing around the trailer. Douglas County Health Department will operate the monitor.

To: carrie.wiese@nebraska.gov[carrie.wiese@nebraska.gov]
Cc: Davis, Michael[Davis.Michael@epa.gov]; Avey, Lance[Avey.Lance@epa.gov]; Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]
From: Grooms, Leland
Sent: Wed 11/2/2016 8:29:31 PM
Subject: RE: North Omaha Station - Possible SO2 Monitoring Site Evaluation

Hi Carrie

I wanted to touch base with you to see if there is a good time we can come up and take a good look at the proposed North Omaha Station site in the next couple of weeks (or sooner). Just let me know what everyone's schedule looks like and we'll figure something out so we can get this done and move forward.

Leland

Leland Grooms, EPA Region 7

Monitoring & Environmental Sampling Branch (MESB)

Senior Environmental Scientist

Leader, Air Monitoring Team

913 551-5010/cp: 913 549-2266

Laws alone can not secure freedom of expression; in order that every man present his views without penalty, there must be spirit of tolerance in the entire population. ***Albert Einstein***

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Wednesday, November 02, 2016 8:30 AM
To: Avey, Lance <Avey.Lance@epa.gov>; Peter, David <peter.david@epa.gov>
Cc: Stoner, Kevin J <kevin.j.stoner@nebraska.gov>; Algoe-Eakin, Amy <Algoe-Eakin.Amy@epa.gov>
Subject: RE: North Omaha Station - Possible SO2 Monitoring Site Evaluation
Importance: High

Hi Lance,

I wanted to check in again regarding EPA's approval of a monitoring site at North Omaha station. I understand it is out of your hands at this point, but it's critical that we receive a response on this as soon as possible because we will need to go to public notice with a revised monitoring plan soon in order to wrap up public comment and submit the plan in enough time to be operational on January 1, and the site prep at North Omaha will also need to begin very soon in order to have the site up and running by January 1.

Please let me know if there is anything we can do/provide to help expedite this process.

Thanks,
Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, October 27, 2016 10:30 AM
To: Wiese, Carrie; Peter, David
Cc: Stoner, Kevin J; Algoe-Eakin, Amy
Subject: RE: North Omaha Station - Possible SO2 Monitoring Site Evaluation

Hi Carrie,

The monitoring staff has been busy (on travel looking at potential DRR sites in Missouri) and have not been able to look at the potential siting concerns of our preferred Site #2. I hope to hear from them as soon as possible and pass that on. On your second question, since the site will be new to the monitoring network, it would be good to public notice the updated plan; given that putting the plan on public notice should not delay the process of getting the new monitor operational by Jan. 1st, 2017.

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Wednesday, October 26, 2016 4:06 PM
To: Avey, Lance <Avey.Lance@epa.gov>; Peter, David <peter.david@epa.gov>
Cc: Stoner, Kevin J <kevin.j.stoner@nebraska.gov>; Algoe-Eakin, Amy <Algoe-Eakin.Amy@epa.gov>
Subject: RE: North Omaha Station - Possible SO2 Monitoring Site Evaluation
Importance: High

Good afternoon, all:

I had a phone call from OPPD this morning, requesting any information on approval of the new SO2 monitoring site (site 1 vs. site 2). Is there any update here? Also, is there any additional information about public notice of our network monitoring plan (whether it would be required to be done again)?

Thanks,
Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]

Sent: Friday, October 21, 2016 9:30 AM
To: Wiese, Carrie; Peter, David
Cc: Stoner, Kevin J; Algoe-Eakin, Amy
Subject: RE: North Omaha Station - Possible SO2 Monitoring Site Evaluation

Hi Carrie,

Thanks for getting the new proposed sites and this information together so quickly. From the technical side, my preference is Site 2 as the modeling predicts that is where we see the greatest potential impacts from OPPD emissions. For Site 1, that was considered on OPPD property, and thus no modeling "receptors" were placed near Site 1 and thus no evaluation of Site 1 in terms of modeled impacts can be done. I attached the modeling results nearby OPPD with the locations of proposed Sites 1 &2 and current Whitmore. Basically, the red dots represent where the modeling predicts the greatest impacts from OPPD emissions. And as you can see that is around Site 2.

At the same time, I understand the interference concerns that you have for Site 2. We will see if the monitoring group shares your interference concerns and pass along their thoughts on the two proposed sites. Hopefully a quick turnaround response can be provided early next week.

Thanks again,

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Thursday, October 20, 2016 3:17 PM
To: Avey, Lance <Avey.Lance@epa.gov>; Peter, David <peter.david@epa.gov>
Cc: Stoner, Kevin J <kevin.j.stoner@nebraska.gov>
Subject: North Omaha Station - Possible SO2 Monitoring Site Evaluation
Importance: High

Good afternoon, Lance and David:

Earlier this week, we spoke with OPPD and Douglas County Health Department regarding the concerns with moving the Whitmore monitor. What was decided as a group was that, rather than running risks with the ozone data for Whitmore and also the potential for having no SO2 data for the new site as of January 1 if there should be any issues getting the monitor up and running, a new SO2 monitor would be established and Whitmore would be left in place. This morning, I visited the area with representatives of OPPD and DCHD to evaluate possible sites to install the monitor, and two locations appeared feasible. Locations and site photos are included in the attachment.

Site 1 may be preferable because it is within a secure fenced area through which entry through a guard shack is required and is already level and paved, thus minimizing the site prep required and offering the most secure location for the monitoring trailer. It is also preferable over Site 2 because dust and possible interference from road and rail traffic will be minimized. However, this is within the fenceline of North Omaha station, which raises concerns about whether it can be considered a valid monitor location for ambient air.

For the latter reason, Site 2 may be preferable. However, again, the parking area is dirt/gravel and dust from this area will require additional maintenance of the monitor stack. It is also within a public access area which, although it would be fenced, may present issues with vandalism. Also as noted above and visible in the attachment, it is along Pershing Blvd. and very near rail line, which may present some interference concerns.

Please let us know, as soon as possible, whether EPA has a preference for one site over the other, or either would be acceptable. DCHD has begun the process of ordering the necessary equipment, but OPPD will require as much lead time as possible to address any site prep issues required, including running electricity, to have the trailer in place and monitoring begun by January 1.

Thanks, and please let me know if you have any questions,

Carrie

Carrie Wiese

Carrie Wiese

Supervisor – Air Quality Grants, Planning and Outreach Unit

Nebraska Department of Environmental Quality

1200 N Street, Suite 400

Lincoln, NE 68508

(402)471-6624, carrie.wiese@nebraska.gov

To: Avey, Lance[Avey.Lance@epa.gov]; Peter, David[peter.david@epa.gov]
Cc: Stoner, Kevin J[kevin.j.stoner@nebraska.gov]; Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]
From: Wiese, Carrie
Sent: Wed 11/2/2016 1:29:47 PM
Subject: RE: North Omaha Station - Possible SO2 Monitoring Site Evaluation

Hi Lance,

I wanted to check in again regarding EPA's approval of a monitoring site at North Omaha station. I understand it is out of your hands at this point, but it's critical that we receive a response on this as soon as possible because we will need to go to public notice with a revised monitoring plan soon in order to wrap up public comment and submit the plan in enough time to be operational on January 1, and the site prep at North Omaha will also need to begin very soon in order to have the site up and running by January 1.

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Sent: Thursday, October 27, 2016 10:30 AM
To: Wiese, Carrie; Peter, David
Cc: Stoner, Kevin J; Algoe-Eakin, Amy
Subject: RE: North Omaha Station - Possible SO2 Monitoring Site Evaluation

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Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

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Sent: Wednesday, October 26, 2016 4:06 PM
To: Avey, Lance <Avey.Lance@epa.gov>; Peter, David <peter.david@epa.gov>
Cc: Stoner, Kevin J <kevin.j.stoner@nebraska.gov>; Algoe-Eakin, Amy <Algoe-Eakin.Amy@epa.gov>
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Thanks again,

Lance

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EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

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Sent: Thursday, October 20, 2016 3:17 PM
To: Avey, Lance <Avey.Lance@epa.gov>; Peter, David <peter.david@epa.gov>
Cc: Stoner, Kevin J <kevin.j.stoner@nebraska.gov>
Subject: North Omaha Station - Possible SO2 Monitoring Site Evaluation
Importance: High

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Carrie

Carrie Wiese

Carrie Wiese

Supervisor – Air Quality Grants, Planning and Outreach Unit

Nebraska Department of Environmental Quality

1200 N Street, Suite 400

Lincoln, NE 68508

(402)471-6624, carrie.wiese@nebraska.gov

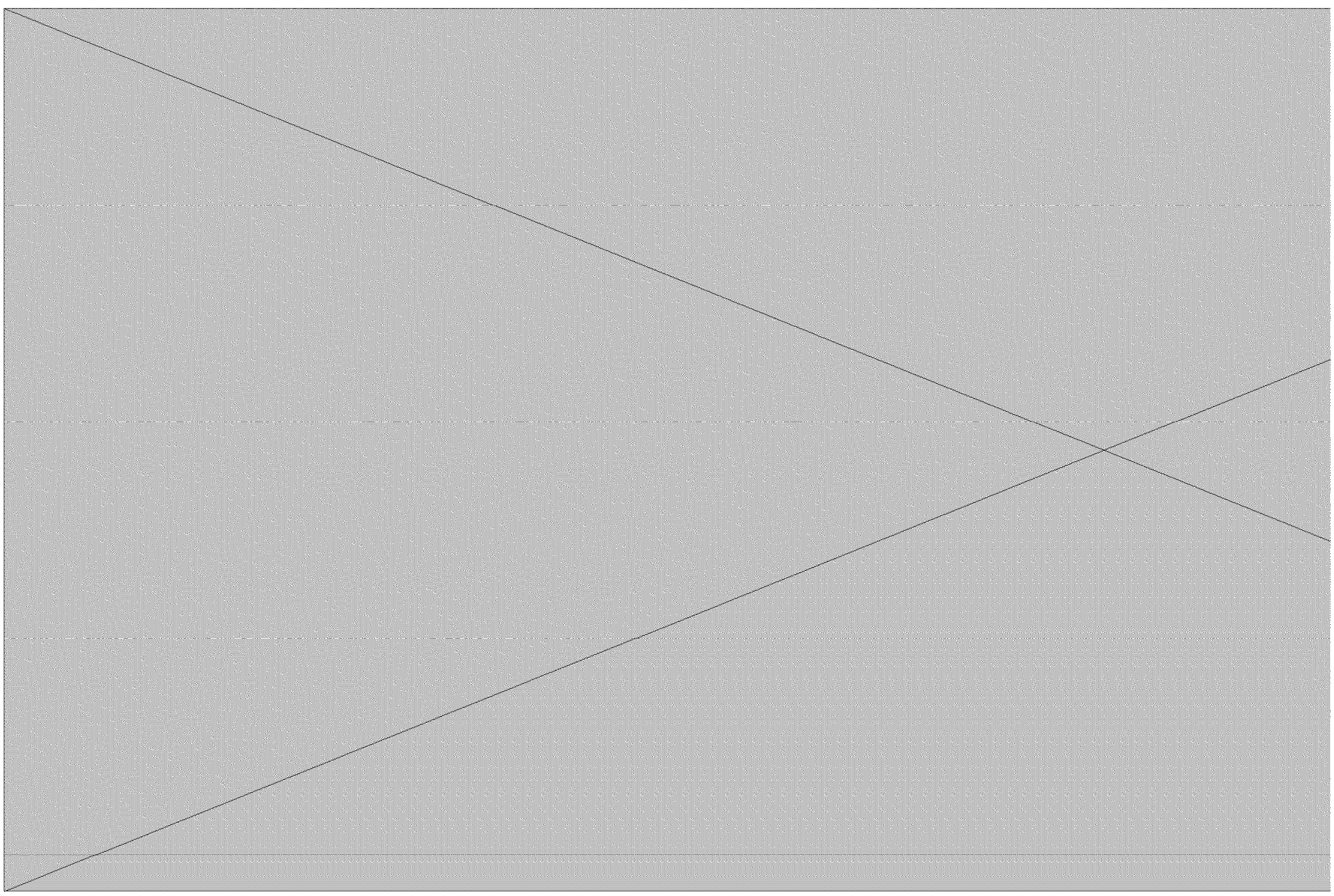
To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Mon 10/24/2016 3:06:38 PM
Subject: RE: new model run -
removed.txt
OPPD monitor_WSEC Oct 18 2016.abc

Lance:

Sorry about the tardy response, I was out sick on Friday.

That zip file contained the following files in screenshot below:

Let me know if it gets through.



****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Friday, October 21, 2016 10:06 AM
To: Alam, Lisa
Subject: RE: new model run -

Hi Lisa,

I got the MAXDAILY file you sent Wednesday. When you get a chance can you try and re-send the File is labeled "OPPD monitor_WSEC Oct 18 2016.piz"? The previous attempt did not go through and I got the message below. Sorry for being a pest ☺:

************************ ATTACHMENT REMOVED ************************

This message contained an attachment which the administrator has caused to be removed.

************************ ATTACHMENT REMOVED ************************

Attachment name: [OPPD monitor_WSEC Oct 18 2016.zip]
Attachment type: [application/x-zip-compressed]

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, October 19, 2016 8:44 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: new model run -

Lance:

Everything mentioned Oct 18, 2016 emails is here, including the *.aml, and *.sum files from yesterday's run, but not the *.amz file.

I can't send the *.amz file – too big, 370MB. I'll have to break out the MAXDAILY files, sort out the highest impacts for source group ALL.

File is labeled "OPPD monitor_WSEC Oct 18 2016.piz"

If the impacts are identical, then there's no reason to go through additional analysis. I haven't compared the *.sum files yet.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, October 19, 2016 7:57 AM
To: Alam, Lisa
Subject: RE: new model run -

Thanks Lisa,

Of course the attachment did not go through, just rename it .piz and try again. Did it look like changed any of the previous results, e.g., the 4th high plt file?

I have wondering before about re-running and having the stored previous run and what that might do. I now usually do every new run with a new name, which is not the most efficient and takes up a lot of space, but may avoid that issue.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 4:18 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: new model run -

Lance:

Browse the attached zip file at your leisure - it contains:

OPPD_WSEC normalized ERs 2012-24 along with the AERMOD hourly emission rates file

the met data from IDNR

Breeze's AERMOD input file and *.amz file of the model that is now running

****

I did have another thought –

I have noticed that if I don't delete Trinity's *.amz file between model runs, it stores all of the old data, all of the met data, all of the hourly emission files, plot files, MAX Daily files, and so on

On at least one occasion this confused an analysis I was preforming, until I deleted and cleared out all of the old data files stored in *.amz

I never got to the bottom of it, but did make a note to self- delete *.amz files.

Maybe this is what happened – maybe IDNR pulled the wrong data files from the *.amz output file.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

Nebraska Department of Environmental Quality (NDEQ)

The Atrium Building, Suite 400, 1200 "N" Street, Lincoln, NE 68508-8922

Phone: 402-471-2925   FAX: 402-471-2909

Website: http://deq.ne.gov Click on "Focus on Air"

************************* ATTACHMENT REMOVED *************************

This message contained an attachment which the administrator has caused to be removed.

************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 10/19/2016 7:18:44 PM
Subject: FW: SO2 mxd Excel Spreadsheet containg every impact above 1 ug/m3
Spreadshet with tab deliniated txt extension.abc

one more time

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Alam, Lisa
Sent: Wednesday, October 19, 2016 2:17 PM
To: Avey, Lance
Subject: FW: SO2 mxd Excel Spreadsheet containg every impact above 1 ug/m3

Jeeeeeeze this is frustrating – I've had so many bounce backs because

too big

wrong extension

I don't know what you've received

There are 15 " SO2MXD 1.abc" files

I also sent an Excel spreadsheet (attached) that I was forced to save as a txt file, Tab delineated. Did that make it through?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Alam, Lisa
Sent: Wednesday, October 19, 2016 2:10 PM
To: Avey, Lance
Subject: SO2 mxd sExcel Spreadsheet containg every impact above 1 ug/m3

Lance:

Going through these files, it appears that the Maximum Daily impacts are not averaged across three years, for each receptor.

I've never used this output option, and the AERMOD USER manual is of limited value.

Shouldn't this analysis be receptor by receptor, averaged across three years? Are these results what we want to look at?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, October 19, 2016 12:11 PM
To: Alam, Lisa
Subject: RE: 2nd email today - Oct 19 2016 OPPD SO2 monitor_WSEC nearby

The zip file attachment did not go through. Try as .piz.

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, October 19, 2016 11:51 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: 2nd email today - Oct 19 2016 OPPD SO2 monitor_WSEC nearby

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

Nebraska Department of Environmental Quality (NDEQ)

The Atrium Building, Suite 400, 1200 "N" Street, Lincoln, NE 68508-8922

Phone: 402-471-2925 FAX: 402-471-2909

Website: http://deq.ne.gov Click on "Focus on Air"

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 10/19/2016 7:17:11 PM
Subject: FW: SO2 mxd Excel Spreadsheet containg every impact above 1 ug/m3
Spreadshet with tab deliniated txt extension .txt

Jeeeeeeze this is frustrating – I've had so many bounce backs because

too big

wrong extension

I don't know what you've received

There are 15 " SO2MXD 1.abc" files

I also sent an Excel spreadsheet (attached) that I was forced to save as a txt file, Tab delineated. Did that make it through?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Alam, Lisa
Sent: Wednesday, October 19, 2016 2:10 PM
To: Avey, Lance
Subject: SO2 mxd sExcel Spreadsheet containg every impact above 1 ug/m3

Lance:

Going through these files, it appears that the Maximum Daily impacts are not averaged across three years, for each receptor.

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Shouldn't this analysis be receptor by receptor, averaged across three years? Are these results what we want to look at?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

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Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, October 19, 2016 11:51 AM
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****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

Nebraska Department of Environmental Quality (NDEQ)

The Atrium Building, Suite 400, 1200 "N" Street, Lincoln, NE 68508-8922

Phone: 402-471-2925   FAX: 402-471-2909

Website: http://deq.ne.gov Click on "Focus on Air"

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 10/19/2016 7:09:35 PM
Subject: SO2 mxd sExcel Spreadsheet containg every impact above 1 ug/m3
SO2 ALL greater than 1-ug per m3.xlsx

Lance:

Going through these files, it appears that the Maximum Daily impacts are not averaged across three years, for each receptor.

I've never used this output option, and the AERMOD USER manual is of limited value.

Shouldn't this analysis be receptor by receptor, averaged across three years? Are these results what we want to look at?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, October 19, 2016 12:11 PM
To: Alam, Lisa
Subject: RE: 2nd email today - Oct 19 2016 OPPD SO2 monitor_WSEC nearby

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Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, October 19, 2016 11:51 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: 2nd email today - Oct 19 2016 OPPD SO2 monitor_WSEC nearby

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

Nebraska Department of Environmental Quality (NDEQ)

The Atrium Building, Suite 400, 1200 "N" Street, Lincoln, NE 68508-8922

Phone: 402-471-2925   FAX: 402-471-2909

Website: http://deq.ne.gov   Click on "Focus on Air"

To: Avey, Lance[Avey.Lance@epa.gov]
Cc: McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]
From: Ashton, Brad [DNR]
Sent: Wed 10/19/2016 3:21:59 PM
Subject: RE: DRR modeling questions
removed.txt
RE: [EXTERNAL] SO2 DRR Modeling Question

Lance,

I've attached an email response from ADM that provides additional information related to question #2 from your previous email below.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

From: Ashton, Brad [DNR]
Sent: Tuesday, September 20, 2016 8:36 AM
To: Avey, Lance (Avey.Lance@epa.gov) <Avey.Lance@epa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: DRR modeling questions

Lance,

Please see my responses in bolded red text below.

- Brad

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, September 13, 2016 10:08 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Subject: DRR modeling questions

Hi Brad,

I have a couple questions on the upcoming DRR modeling for some Iowa sources:

1) For IPL Prairie Creek, have the modeled emissions rate for Boiler #1,2,3,4 been determined? The protocol I have says TBD. Are they planning to use existing limits, new limits, or actuals?

For boilers 1-3 we are using annual average actual emissions. For boiler 4 we are using a new emission limit based on natural gas that will require compliance in late 2017.

2) For ADM Cedar Rapids, are the five boilers being modeled with actual emissions? The protocol mentions a mix of potential and actuals for ADM sources.

The boilers were modeled using emission rates that are approximately 5-10% higher than the maximum annual average actuals for the period 2012-2014.

3) For Walter Scott, is the nearby OPPD emissions still planning to be modeled using the maximum 1-hr emissions over the most recent 3-yr period? Are OPPD Units 1-3 (which have shutdown) still planned to be modeled as the original protocol states?

We are still deciding how to proceed.

4) For George Neal, since it was designated unclassifiable for the last round, does IDNR plan to submit updated modeling? Since George Neal is still under consideration for the DRR, the most recent years of meteorology and emissions information (2013-2015 instead of 2012-2014) may need to be considered.

We may re-recommend attainment/unclassifiable now that the permits for George Neal North Units 1 & 2 have been rescinded, but there is no need to update the modeling since we used maximum allowable emission rates and 2012-2014 meteorology.

5) The background value to be used is the updated statewide value of 7ug/m3? Some DRR protocols mention the previous 32 ug/m3.

We will be using a background of 7 ug/m^3 because all nearby sources of SO2 are already included in each model. This background concentration is representative of natural background in the absence of local sources of SO2.

Thanks for any information, and please let me know of questions.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

To: brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]
From: Stephens, Rich
Sent: Tue 10/11/2016 11:15:01 PM
Subject: RE: [EXTERNAL] SO2 DRR Modeling Question

Brad,

My apology for allowing this email to be buried in my inbox without a response.

I do not have a good answer for the 5-10% difference. ADM does intend to use actual emissions.

The ADM model may have used a short term stack test result with a 10% confidence adjustment. In some of the my old emission inventories I would add a 10% adjustment to stack test result.

Actual emissions should be the total tons as monitored by the CEMs divided by the hours of operation of each boiler for each year.

Rich

Rich Stephens

ADM Cedar Rapids

Environmental Coordinator

319-398-0735

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Thursday, September 15, 2016 1:55 PM
To: Stephens, Rich <Rich.Stephens@adm.com>

Subject: [EXTERNAL] SO2 DRR Modeling Question

Rich,

We have received some questions from EPA regarding the emission rates that will be used in the various SO2 DRR modeling analyses being conducted. One of these questions is regarding the five boilers at ADM. They would like to know if actuals or potentials will be used for these sources. During my review of the modeling I noted that the emission rates for these sources (SEP501, SEP502, and SEP530) are lower than the permitted allowables, but are approximately 5-10% higher than the maximum reported actual emission rate during the period 2012-2014.

I intend to respond to EPA letting them know that actuals are being used, but I would also like to be able to explain why the modeled emission rates are higher than what was reported in the inventory. Could you please provide a brief description of the basis for these emission rates?

Thank you,

Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

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************************* ATTACHMENT REMOVED *************************

This message contained an attachment which the administrator has caused to be removed.

************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

To: Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]; Avey, Lance[Avey.Lance@epa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]
Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]
From: Alam, Lisa
Sent: Tue 10/18/2016 8:28:01 PM
Subject: RE: normalized SO2 modeling
removed.txt

SO LOCATION EP003 POINT 261898.22 4562476.92 294.72 **298.92 4.2 m higher**

SO LOCATION EP141 POINT 262145.9 4562589.8 294.7 **297.55 3.0 m higher**

My elevations are higher, by the amount listed above. I have the same elevations in the old model, and in the "new" model,

after re-running AERMAP, using datum WGS84. My locations, XUTM and YUTM are identical to yours, in both models.

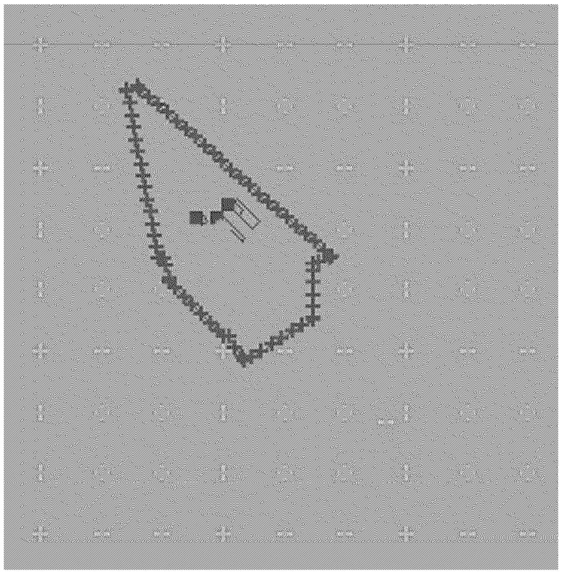
I will run WSEC & OPPD using the AERMAP elevations I obtained today.

I have re-set the OPPD UNIT 4 & 5 emission rates. Apparently the problem occurred when using Trinity Breeze's Project Tool –

"Hourly Emission File Editor" although I'm still uncertain how this happened.

****

Lance - FYI: The "old model" mentioned above is the model with the corrected Whitmore monitor location.



****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Krzak, Jennifer [DNR] [mailto:Jennifer.Krzak@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 2:11 PM
To: Alam, Lisa; Avey, Lance; Ashton, Brad [DNR]
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: RE: normalized SO2 modeling

Here is the info for the Walter Scott sources direct from our input file. All units are of course in meters and listed in order of X, Y and Elevation.

SO LOCATION EP003 POINT 261898.22 4562476.92 294.72

SO LOCATION EP141 POINT 262145.9 4562589.8 294.7

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 1:48 PM
To: Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Jennifer:

Please send coordinates (XUTMs and YUTMs) and elevations in WGS84 or NAD83, for point sources, EP003 and EP141. Please label the coordinates

and include the units.

As a result of this issue, I will take a closer look at NAD83. The USGS Web site says NED GeoTIFF files use datum NAD83. However, I have

read that you need to go out to the 4th or 5th decimal point before you begin to see a difference between WGS84 and NAD83. NAD83 was originally

set up in the 1980s to measure movement of the North American plate. Maybe now these two datum have larger differences than they once had.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Krzak, Jennifer [DNR] [mailto:Jennifer.Krzak@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 12:32 PM
To: Avey, Lance; Ashton, Brad [DNR]; Alam, Lisa
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: RE: normalized SO2 modeling

It is not the receptor elevations where we are seeing a difference, since we have not generated a 20 km receptor grid like that which has been created for OPPD we cannot compare those values. The point source elevations are where we initially saw a difference. The source locations are the same but our elevations range from about 2 to 4 meters higher, depending on whether it's a WSEC or OPPD source. We generally use NAD83.

Jennifer

JENNIFER KRZAK Environmental Specialist
Iowa Department of Natural Resources

P 515.725.9532 | F 515.725.9501 | jennifer.krzak@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Road, Suite 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692
WWW.IOWADNR.GOV
Leading Iowans in Caring for Our Natural Resources.

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, October 18, 2016 11:34 AM

To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; lisa.alam@nebraska.gov
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Hi All,

Is it the receptor elevations that are different? If Lisa's and Brad's receptor locations differ, wouldn't the elevations potentially differ? p.s., I see Lisa just asked this question.

Pasted below is the 1 arc second NED file and the elevation within 20 km of OPPD. Also, on the left, it gives the maximum, minimum, and specific source elevation in meters. Does this look like the terrain file you all are using?

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 10:52 AM
To: lisa.alam@nebraska.gov
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: normalized SO2 modeling

Lisa,

The elevation data we used are also 1-arc second files. I'm not sure of the reason for this discrepancy. You might check your AERMAP files to confirm the correct datum is being used. Beyond that I'm not sure why we would be getting different elevations.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

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From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 10:31 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Mathew:

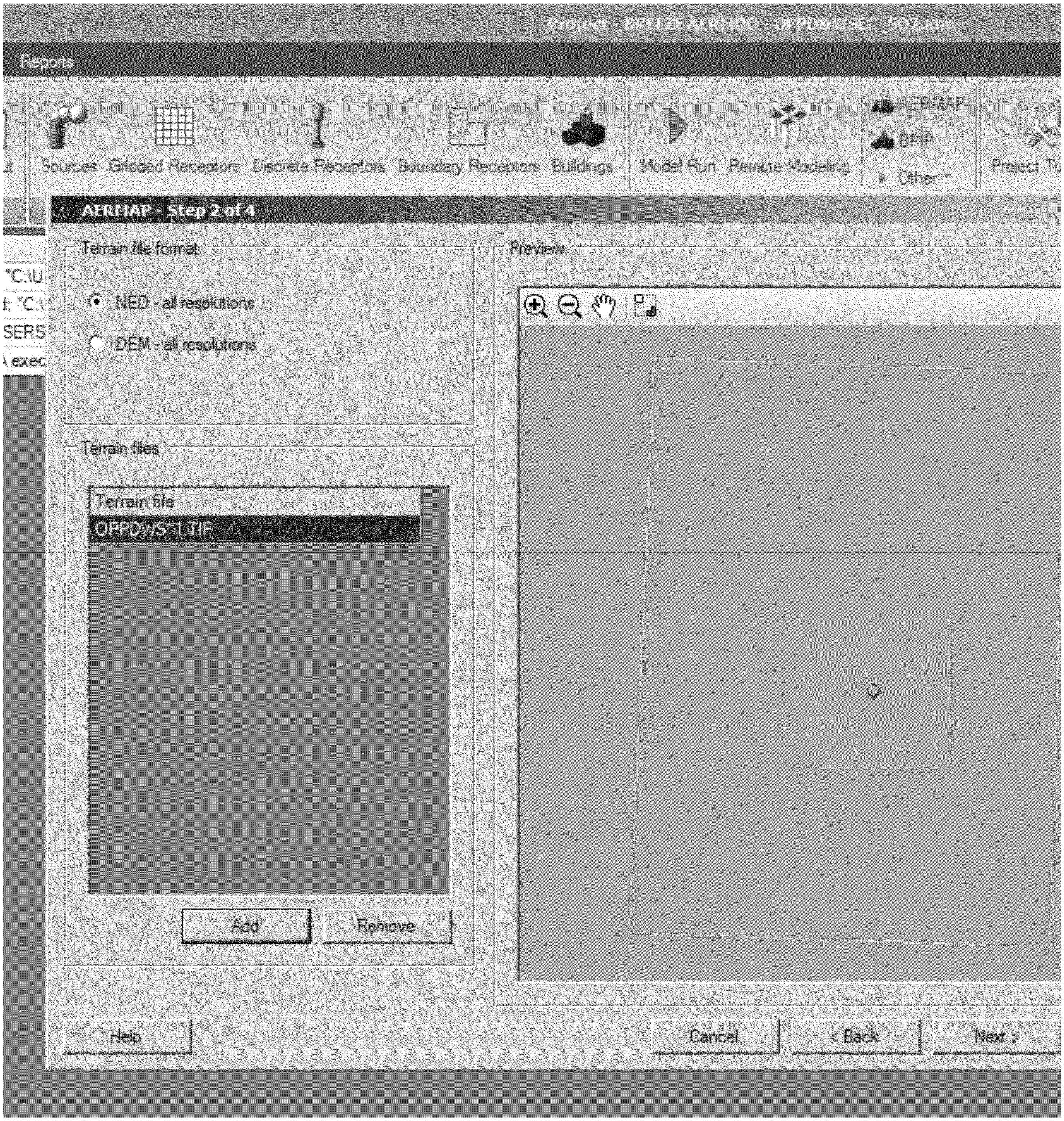
Thank you for your response.

You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

http://www.mrlc.gov/viewerjs/

I obtained a large elevation file to fit my receptor grid


Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Preview
Help
Cancel
< Back
Next >

using 1 arc second, datum WGS 84, and UTM zone 15, in a 100MB GeoTIFF file.

I did not break out receptors lying in zone 14, which begins ~ 6 km west of OPPD, in the City of Omaha.

I can rerun AERMAP – which will take some time as there are 11,435 receptors, so I'm hesitate to do that.

If Brad Ashton used 1/3 arc second, this might account for the differences in elevations.

Let me know what you think.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 9:29 AM
To: Alam, Lisa; Avey, Lance
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

It sounds like you understand our concerns, so we feel a call is no longer necessary. Unfortunately we don't have a receptor to grid that would suit your purposes, our grid is focused on Walter Scott.

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 9:05 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

Yes, that can work for but might be unnecessary.

Looking through the original emission files from OPPD, I do have emission rates that vary hourly for OPPD Units 4 & 5, but somehow when combining OPPD and WSEC in Excel to create a single hourly emission rate file, there appears to be an error. Thank you for pointing that out. I intend to rerun the OPPD model, combined with WSEC emissions today, correcting the emissions from OPPD.

As to the elevations, I could rerun AERMAP, but the results won't be any different. There are difficulties when as area is located in two Zones. I have rarely encounter this situation. I choose Zone 15, which is Iowa and part of Eastern Nebraska, including a large part of Douglas County. Do you have a problem with that approach? Do you want to send me your receptor grid?

Lance, do you have a problem with me using IDNR's receptor grid?

It' unlikely these changes will alter the results of the final product, but there's only one way to find out.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 8:36 AM
To: Alam, Lisa
Subject: RE: normalized SO2 modeling

Does this work for you Lisa?

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Tuesday, October 18, 2016 8:17 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Alam, Lisa <lisa.alam@nebraska.gov>
Cc: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

This Wednesday would be better for me; next Wednesday I will be out of the office.

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 7:34 AM
To: Wiese, Carrie; Alam, Lisa
Cc: Ashton, Brad [DNR]; Krzak, Jennifer [DNR]; McGraw, Jim [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

We'd like to have a call to discuss this further. Would any of these times work for you and Carrie?

Tomorrow (Wed 10/19) at 1 or 2 pm

Wed 10/26 at 2 pm?

Thank you,

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, October 17, 2016 4:28 PM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

That's a big difference. I ran AERMAP using an NED GeoTIFF elevation file downloaded from the USGS Website, **WGS 84, Zone 15**

I can send the *.tif file to you, although it's 100mb file. Some of the receptors are in Zone 14, but most of the receptors were in Zone 15, and I made a simplifying assumption that all were in Zone 15, but that would have effected only those receptors 6 to 7 km West of OPPD No Omaha.

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

I'm not certain I followed your comment #2, maybe it's just too late in the day.

- WSEC - each of the two emission units were normalized independently of each other (2013-15) using the largest emission rate from each emission unit, with a focus on modeling only the two largest emission units.

- OPPD provided the normalized emission rates to NDEQ, along with the varying temperature and velocity rates. They provided these values using their CEMs data, which might not match up exactly with the Air Markets Program Data. Initially, OPPD sent 2012-14 emission rates, and later sent 2015 emissions and parameters.

- I'm not aware of an additional hourly file, since I used only one hourly file in the AERMOD run. I believe you received your data package from Lance Avey at Region 7, and there may be some confusion that happen in the transfer of files. Let me speak to Lance tomorrow morning.

If you have any questions, comments, clarifications, feel free to give me a call.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

Hi Lisa,

Can you address Matthew's questions?

Thanks,

Carrie

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Monday, October 17, 2016 1:24 PM
To: Wiese, Carrie
Cc: McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]

Subject: normalized SO2 modeling

Hello Carrie,

We've reviewed the OPPD and Walter Scott normalized modeling analysis used to support the Nebraska SO2 monitor siting analyses (EPA sent us a copy). A couple of items caught our attention.

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

We'd be happy to discuss this further and to set up a call when you're ready.

Matthew

MATTHEW JOHNSON, Long Range Planning & Regional Modeling
Iowa Department of Natural Resources

P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: lisa.alam@nebraska.gov[lisa.alam@nebraska.gov]; Avey, Lance[Avey.Lance@epa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]
Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]
From: Krzak, Jennifer [DNR]
Sent: Tue 10/18/2016 7:11:10 PM
Subject: RE: normalized SO2 modeling
removed.txt

Here is the info for the Walter Scott sources direct from our input file. All units are of course in meters and listed in order of X, Y and Elevation.

SO LOCATION EP003 POINT 261898.22 4562476.92 294.72

SO LOCATION EP141 POINT 262145.9 4562589.8 294.7

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 1:48 PM
To: Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Jennifer:

Please send coordinates (XUTMs and YUTMs) and elevations in WGS84 or NAD83, for point sources, EP003 and EP141. Please label the coordinates

and include the units.

As a result of this issue, I will take a closer look at NAD83. The USGS Web site says NED GeoTIFF files use datum NAD83. However, I have

read that you need to go out to the 4th or 5th decimal point before you begin to see a difference between WGS84 and NAD83. NAD83 was originally

set up in the 1980s to measure movement of the North American plate. Maybe now these two datum have larger differences than they once had.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Krzak, Jennifer [DNR] [mailto:Jennifer.Krzak@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 12:32 PM
To: Avey, Lance; Ashton, Brad [DNR]; Alam, Lisa
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: RE: normalized SO2 modeling

It is not the receptor elevations where we are seeing a difference, since we have not generated a 20 km receptor grid like that which has been created for OPPD we cannot compare those values. The point source elevations are where we initially saw a difference. The source locations are the same but our elevations range from about 2 to 4 meters higher, depending on whether it's a WSEC or OPPD source. We generally use NAD83.

Jennifer

JENNIFER KRZAK Environmental Specialist
Iowa Department of Natural Resources

P 515.725.9532 | F 515.725.9501 |jennifer.krzak@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Road, Suite 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

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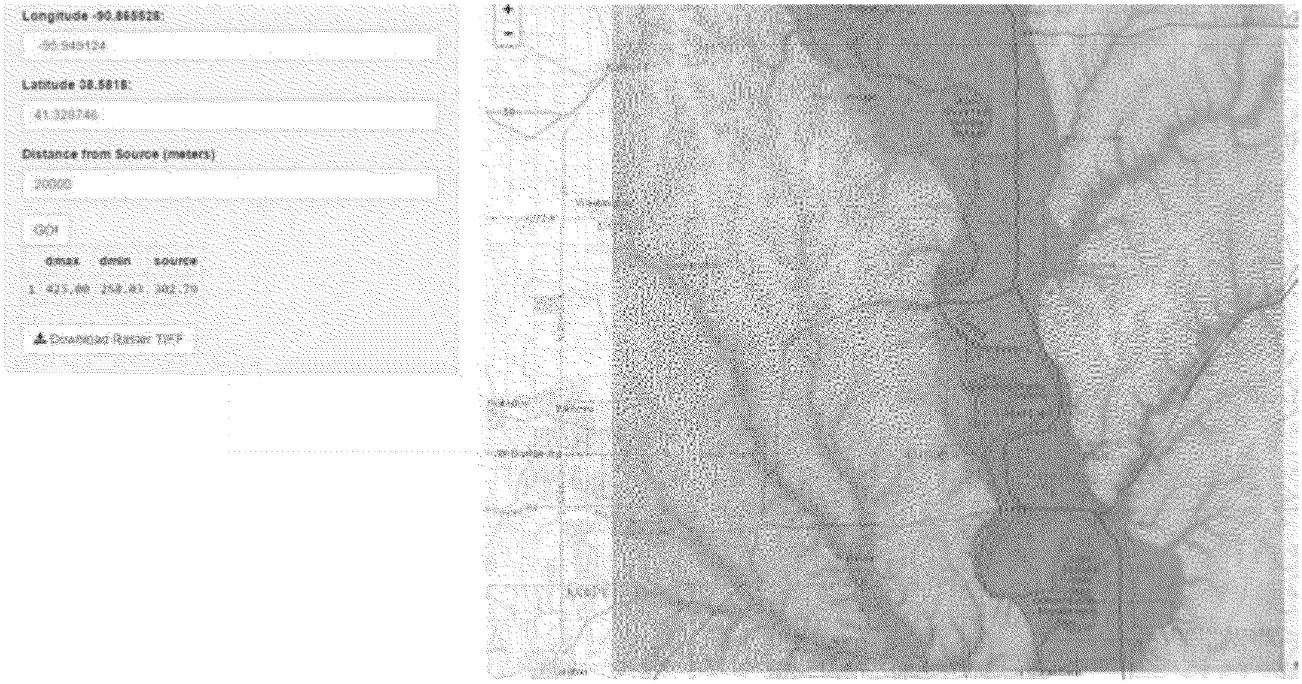
From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, October 18, 2016 11:34 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; lisa.alam@nebraska.gov
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

Hi All,

Is it the receptor elevations that are different? If Lisa's and Brad's receptor locations differ, wouldn't the elevations potentially differ? p.s., I see Lisa just asked this question.

Pasted below is the 1 arc second NED file and the elevation within 20 km of OPPD. Also, on the left, it gives the maximum, minimum, and specific source elevation in meters. Does this look like the terrain file you all are using?



Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 10:52 AM
To: lisa.alam@nebraska.gov

Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
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Lisa,

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- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

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Mathew:

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You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

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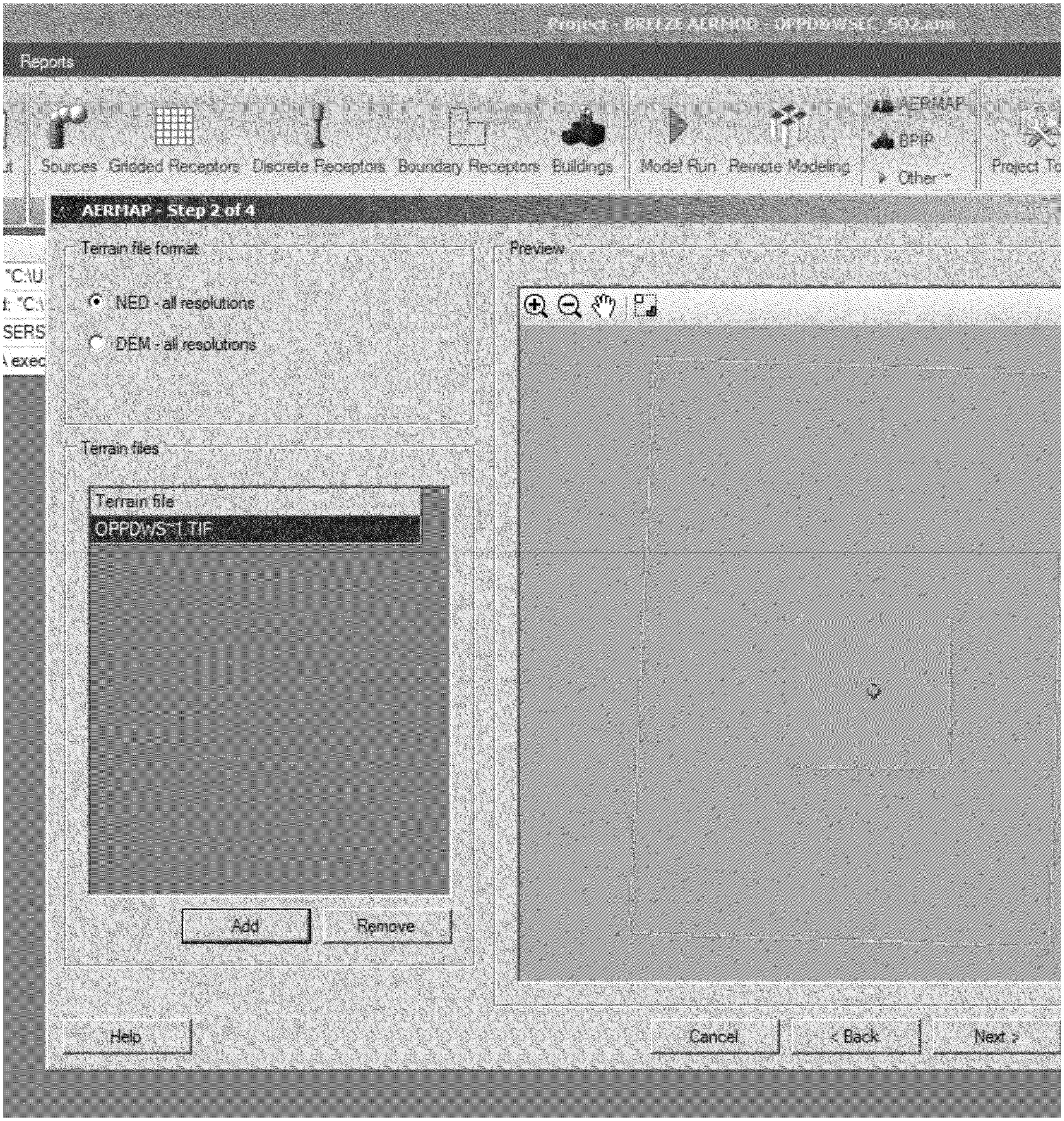
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Preview
Help
Cancel
< Back
Next >

using 1 arc second, datum WGS 84, and UTM zone 15, in a 100MB GeoTIFF file.

I did not break out receptors lying in zone 14, which begins ~ 6 km west of OPPD, in the City of Omaha.

I can rerun AERMAP – which will take some time as there are 11,435 receptors, so I'm hesitate to do that.

If Brad Ashton used 1/3 arc second, this might account for the differences in elevations.

Let me know what you think.

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Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

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Sent: Tuesday, October 18, 2016 9:29 AM
To: Alam, Lisa; Avey, Lance
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

It sounds like you understand our concerns, so we feel a call is no longer necessary. Unfortunately we don't have a receptor to grid that would suit your purposes, our grid is focused on Walter Scott.

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, October 18, 2016 9:05 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

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Lance, do you have a problem with me using IDNR's receptor grid?

It' unlikely these changes will alter the results of the final product, but there's only one way to find out.

****

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(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 18, 2016 8:36 AM
To: Alam, Lisa
Subject: RE: normalized SO2 modeling

Does this work for you Lisa?

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
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To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Alam, Lisa <lisa.alam@nebraska.gov>
Cc: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>
Subject: RE: normalized SO2 modeling

This Wednesday would be better for me; next Wednesday I will be out of the office.

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Cc: Ashton, Brad [DNR]; Krzak, Jennifer [DNR]; McGraw, Jim [DNR]
Subject: RE: normalized SO2 modeling

Hello Lisa,

We'd like to have a call to discuss this further. Would any of these times work for you and Carrie?

Tomorrow (Wed 10/19) at 1 or 2 pm

Wed 10/26 at 2 pm?

Thank you,

Matthew

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, October 17, 2016 4:28 PM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

Mathew:

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

That's a big difference. I ran AERMAP using an NED GeoTIFF elevation file downloaded from the USGS Website, **WGS 84, Zone 15**

I can send the *.tif file to you, although it's 100mb file. Some of the receptors are in Zone 14, but most of the receptors were in Zone 15, and I made a simplifying assumption that all were in Zone 15, but that would have effected only those receptors 6 to 7 km West of OPPD No Omaha.

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

I'm not certain I followed your comment #2, maybe it's just too late in the day.

•□□□□□□□□ WSEC - each of the two emission units were normalized independently of each other (2013-15) using the largest emission rate from each emission unit, with a focus on modeling only the two largest emission units.

•□□□□□□□□ OPPD provided the normalized emission rates to NDEQ, along with the varying temperature and velocity rates. They provided these values using their CEMs data, which might not match up exactly with the Air Markets Program Data. Initially, OPPD sent 2012-14 emission rates, and later sent 2015 emissions and parameters.

•□□□□□□□□ I'm not aware of an additional hourly file, since I used only one hourly file in the AERMOD run. I believe you received your data package from Lance Avey at Region 7, and there may be some confusion that happen in the transfer of files. Let me speak to Lance tomorrow morning.

If you have any questions, comments, clarifications, feel free to give me a call.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

Hi Lisa,

Can you address Matthew's questions?

Thanks,

Carrie

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Monday, October 17, 2016 1:24 PM
To: Wiese, Carrie
Cc: McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]

Subject: normalized SO2 modeling

Hello Carrie,

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1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

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To: Wiese, Carrie[carrie.wiese@nebraska.gov]
Cc: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Tue 10/18/2016 7:05:08 PM
Subject: RE: normalized SO2 modeling
removed.txt

Carrie:

I won't have results until tomorrow morning, at the earliest.

Lance agrees with me on two points:

1. whether we're using a fixed emission rate or a variable emission rate, there shouldn't be any big changes to locations already identified as suitable for an additional SO2 monitor.

2. NAD83 and WGS84 are, for all practical purposes, are identical, at least that is what the literature says. NAD83 was intended to track the movement of the North American plate, and since the early 1980s, differences of several feet may have evolved, but you need to go out to the 4th or 5th decimal point to discern any difference between the two datum. AERMOD has little sensitivity to a few feet or a few meters.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Tuesday, October 18, 2016 12:58 PM
To: Alam, Lisa
Subject: RE: normalized SO2 modeling

OK, thanks Lisa. Please let me know if anything would change; I'm to visit the site Thursday a.m.

From: Alam, Lisa
Sent: Tuesday, October 18, 2016 11:23 AM
To: Ashton, Brad [DNR]
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Krzak, Jennifer [DNR]; Johnson, Matthew [DNR]; Avey, Lance
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Brad:

Thank you for your response.

I did check the run to make sure the correct datum was used. I opened the AERMAP processor within Trinity Breeze's AERMOD GUI, and all of the correct values were there, including zone 15. The "Projection tab" was correctly set at Zone 15. I'm generally running zone 14, so seeing zone 15 gives me confidence. I always use WGS 84, and that was set correctly.

It's unlikely we have identical receptor locations, even where the receptor grid overlaps. Perhaps that is why you feel the elevations are off?

I'll rerun the model using the corrected OPPD emission rates.

Carrie: I'm using normalized emission rates, so using varying emission rates will probably not change the locations identified as possible sites for an additional SO2 monitor near North Omaha OPPD.

****

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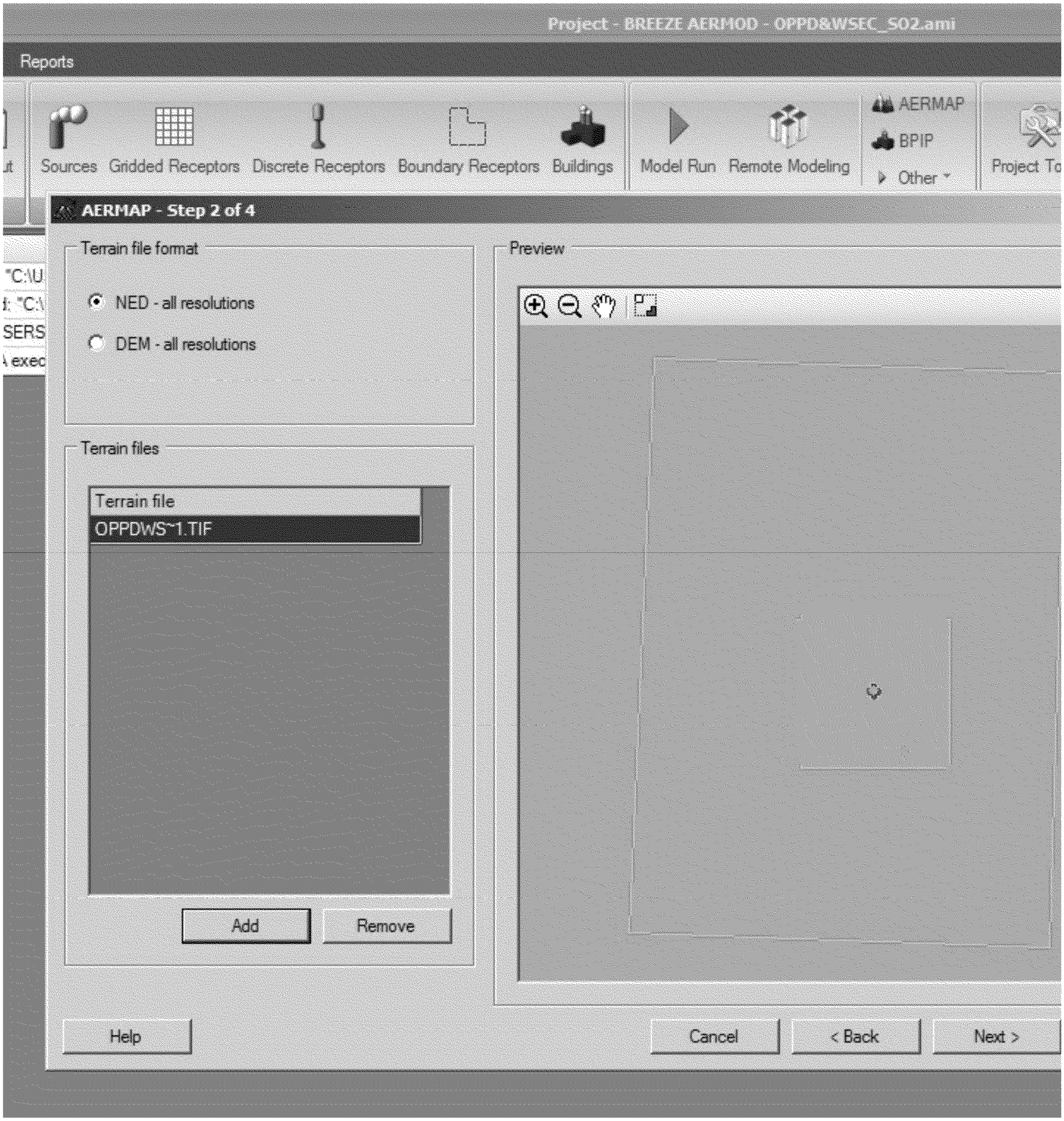
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
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Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

Hi Lisa,

Can you address Matthew's questions?

Thanks,

Carrie

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
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To: Wiese, Carrie
Cc: McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]

Subject: normalized SO2 modeling

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From: Alam, Lisa
Sent: Tue 10/18/2016 6:47:37 PM
Subject: RE: normalized SO2 modeling
removed.txt

Jennifer:

Please send coordinates (XUTMs and YUTMs) and elevations in WGS84 or NAD83, for point sources, EP003 and EP141. Please label the coordinates

and include the units.

As a result of this issue, I will take a closer look at NAD83. The USGS Web site says NED GeoTIFF files use datum NAD83. However, I have

read that you need to go out to the 4th or 5th decimal point before you begin to see a difference between WGS84 and NAD83. NAD83 was originally

set up in the 1980s to measure movement of the North American plate. Maybe now these two datum have larger differences than they once had.

****

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Air Program Planning and Development Team, Air Quality Division

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Sent: Tuesday, October 18, 2016 12:32 PM
To: Avey, Lance; Ashton, Brad [DNR]; Alam, Lisa

Cc: Wiese, Carrie; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: RE: normalized SO2 modeling

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Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

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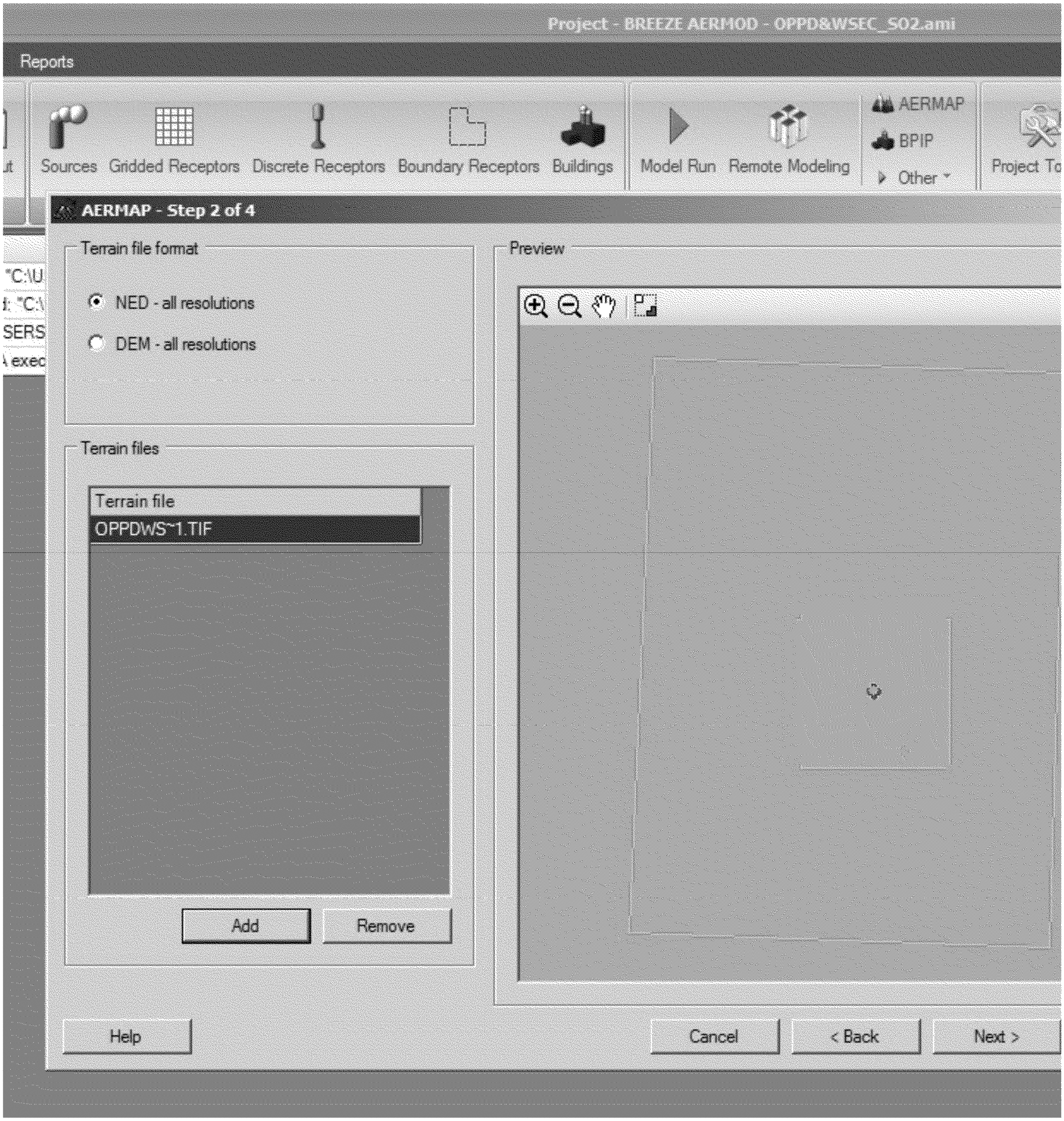
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Preview
Help
Cancel
< Back
Next >

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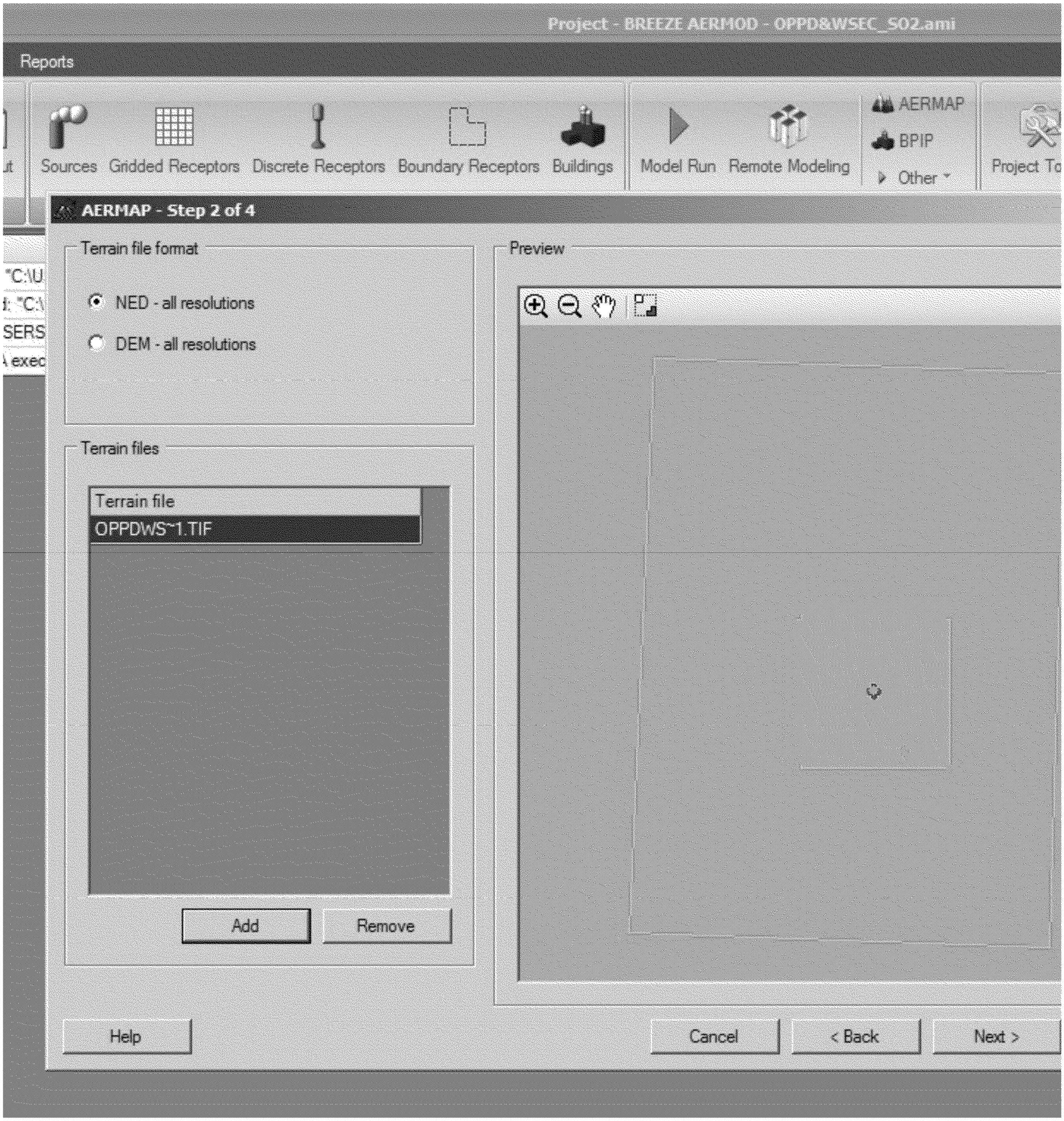
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
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From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, October 17, 2016 4:28 PM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: normalized SO2 modeling

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Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

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From: Alam, Lisa
Sent: Tue 10/18/2016 4:23:03 PM
Subject: RE: normalized SO2 modeling
removed.txt

Brad:

Thank you for your response.

I did check the run to make sure the correct datum was used. I opened the AERMAP processor within Trinity Breeze's AERMOD GUI, and all of the correct values were there, including zone 15. The "Projection tab" was correctly set at Zone 15. I'm generally running zone 14, so seeing zone 15 gives me confidence. I always use WGS 84, and that was set correctly.

It's unlikely we have identical receptor locations, even where the receptor grid overlaps. Perhaps that is why you feel the elevations are off?

I'll rerun the model using the corrected OPPD emission rates.

Carrie: I'm using normalized emission rates, so using varying emission rates will probably not change the locations identified as possible sites for an additional SO2 monitor near North Omaha OPPD.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

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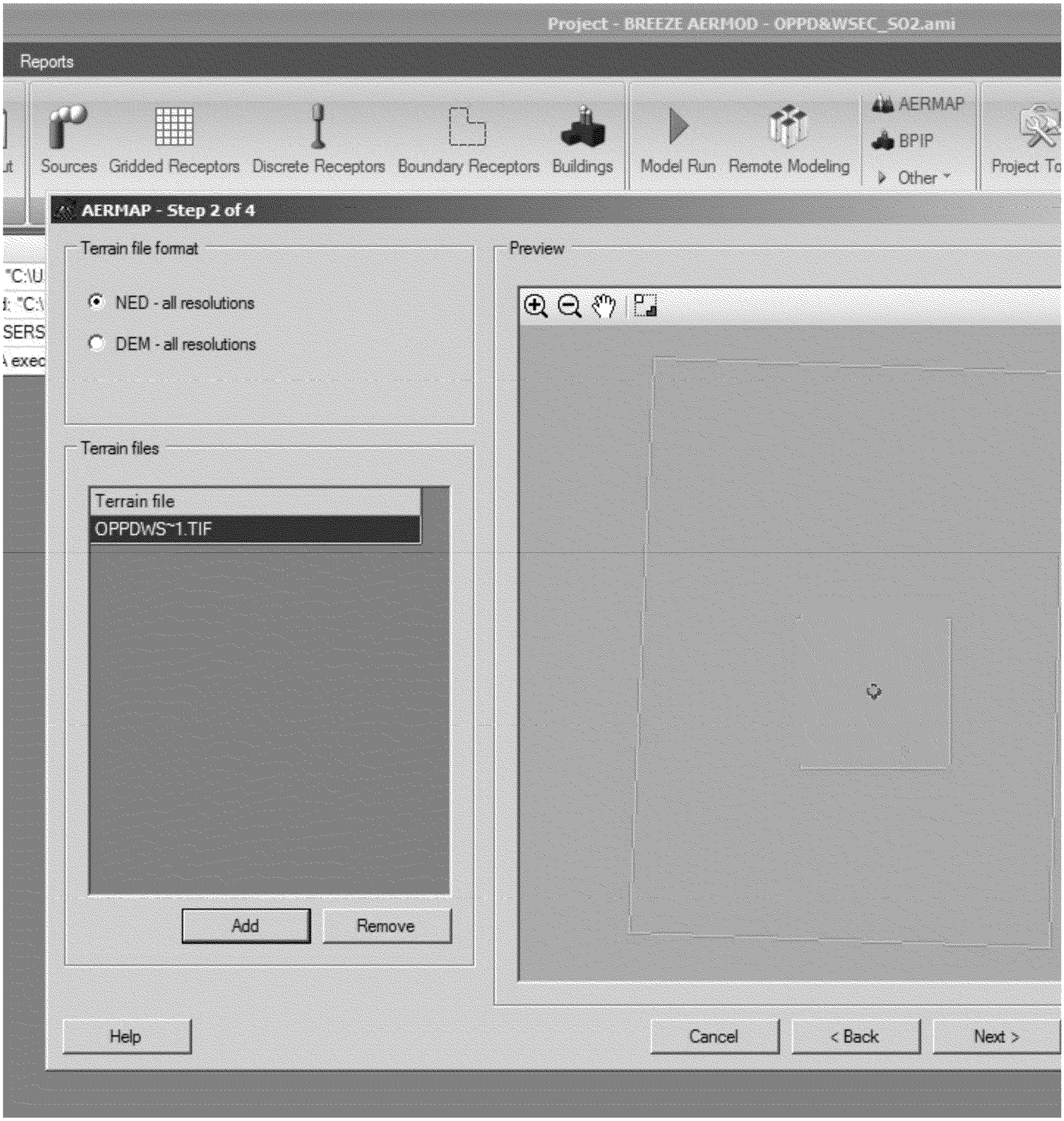
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Preview
Help
Cancel
< Back
Next >

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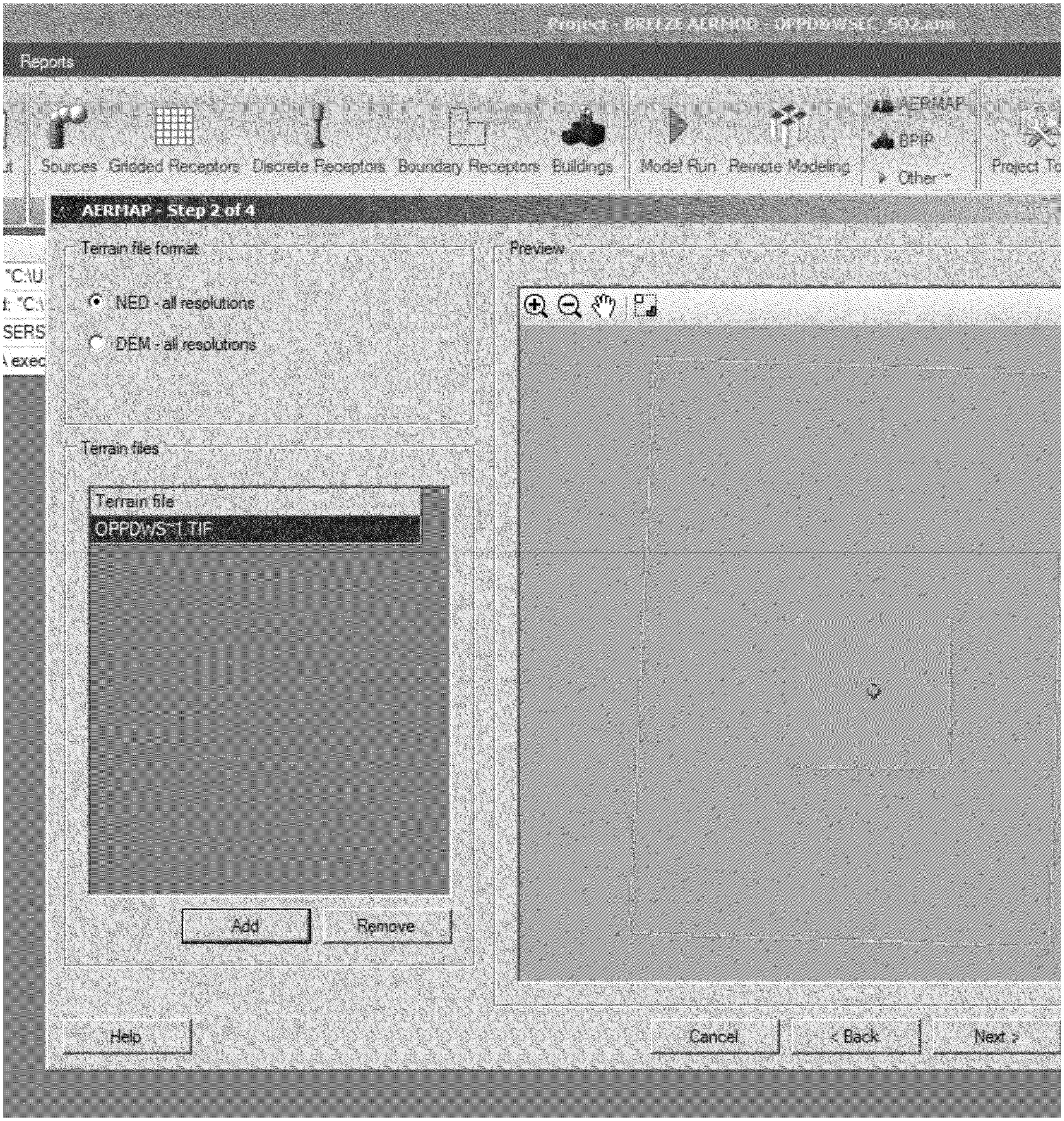
Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Terrain files
Terrain file
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Add
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To: Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; Avey, Lance[Avey.Lance@epa.gov]
Cc: Wiese, Carrie[carrie.wiese@nebraska.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]
From: Alam, Lisa
Sent: Tue 10/18/2016 3:30:57 PM
Subject: RE: normalized SO2 modeling

Mathew:

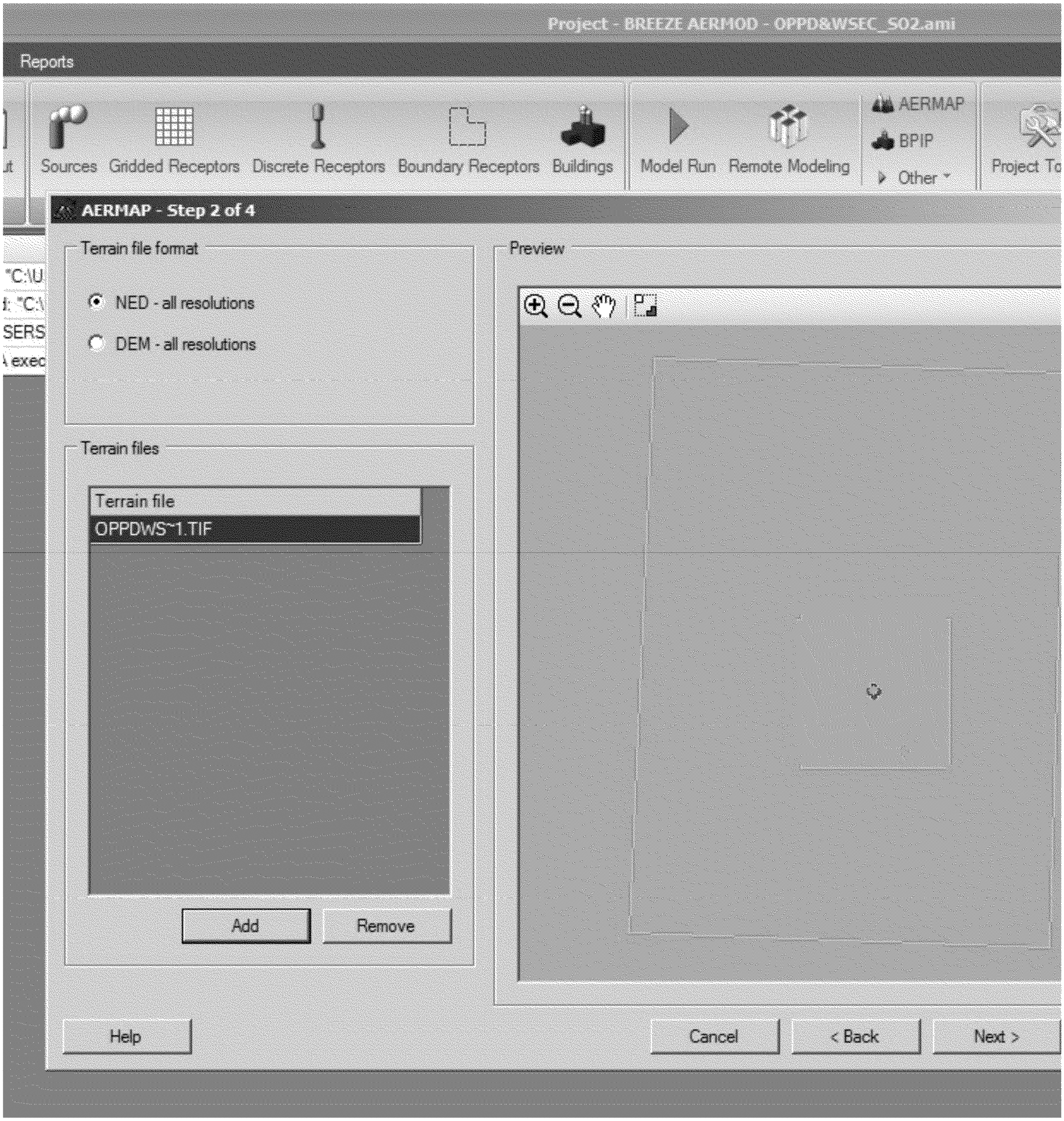
Thank you for your response.

You did not address whether or not my approach used to establish elevations is deemed satisfactory to you.

From USGS site

http://www.mrlc.gov/viewerjs/

I obtained a large elevation file to fit my receptor grid


Project - BREEZE AERMOD - OPPD&WSEC_SO2.ami
Reports
Sources
Gridded Receptors
Discrete Receptors
Boundary Receptors
Buildings
Model Run
Remote Modeling
AERMAP
BPIP
Other
AERMAP - Step 2 of 4
Terrain file format
NED - all resolutions
DEM - all resolutions
Terrain files
Terrain file
OPPDWS~1.TIF
Add
Remove
Preview
Help
Cancel
< Back
Next >

using 1 arc second, datum WGS 84, and UTM zone 15, in a 100MB GeoTIFF file.

I did not break out receptors lying in zone 14, which begins ~ 6 km west of OPPD, in the City of Omaha.

I can rerun AERMAP – which will take some time as there are 11,435 receptors, so I'm hesitate to do that.

If Brad Ashton used 1/3 arc second, this might account for the differences in elevations.

Let me know what you think.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
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To: Alam, Lisa; Avey, Lance
Cc: Wiese, Carrie; McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
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****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Wiese, Carrie
Sent: Monday, October 17, 2016 2:09 PM
To: Alam, Lisa
Subject: FW: normalized SO2 modeling

Hi Lisa,

Can you address Matthew's questions?

Thanks,

Carrie

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Monday, October 17, 2016 1:24 PM
To: Wiese, Carrie
Cc: McGraw, Jim [DNR]; Ashton, Brad [DNR]; Krzak, Jennifer [DNR]
Subject: normalized SO2 modeling

Hello Carrie,

We've reviewed the OPPD and Walter Scott normalized modeling analysis used to support the Nebraska SO2 monitor siting analyses (EPA sent us a copy). A couple of items caught our attention.

1. The NDEQ's base elevations differ by a few meters from the Iowa DNR's. Perhaps a different datum or UTM Zone was used?

2. The normalized rates appear to be correctly calculated for the WSEC sources, EP003 and EP141, but incorrect for the Unit 4 and 5 sources at OPPD. It doesn't appear that the OPPD sources were calculated using the maximum concentration from all four sources and secondly, beyond the first hour of data, the normalized emission rate used for the two OPPD sources is exactly the same for all remaining hours even though the actual rates differ per hour and per unit. NDEQ provided an additional hourly file for just OPPD for 2013 to 2015 which appears to be correctly normalized using the highest concentration in that file but that is not the hourly file called upon in the AERMOD input file.

We'd be happy to discuss this further and to set up a call when you're ready.

Matthew

MATTHEW JOHNSON, Long Range Planning & Regional Modeling
Iowa Department of Natural Resources

P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: Avey, Lance[Avey.Lance@epa.gov]
Cc: brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]
From: Zayudis, Peter [DNR]
Sent: Thur 10/6/2016 6:15:23 PM
Subject: RE: EPA/DNR Cedar Rapids SO2 discussion
removed.txt
DNR_PCS #1 and #2 1-hr SO2 data.xlsx
DNR_PCS #3 1-hr SO2 data.xls

Good afternoon Lance,

Find attached to this e-mail, the SO2 data for Boilers 1 &2 (EP001) and Boiler 3 (EP003) at IPL-Prairie Creek Generating Station as requested during our call today. Each data set represents Boilers, 1, 2 and 3 operation on ultra-low sulfur coal. If you have any questions, please let me know.

Thanks

Pete

PETER ZAYUDIS Environmental Engineer Senior
Iowa Department of Natural Resources

P 515.725.9578 | F 515.725.9501 | Email.
peter.zayudis@dnr.iowa.gov

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Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Zayudis, Peter [DNR] <Peter.Zayudis@dnr.iowa.gov>
Subject: RE: EPA/DNR Cedar Rapids SO2 discussion

Hi Matthew,

A couple people out of the office here today so not sure of their schedules, but let's lock in Thurs 10/6 at 10am. That should work, and will let you know in advance if we would need to re-shedule.

Thanks for setting this up,

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

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The boilers were modeled using emission rates that are approximately 5-10% higher than the maximum annual average actuals for the period 2012-2014.

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Thanks for any information, and please let me know of questions.

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************************* ATTACHMENT REMOVED *************************

This message contained an attachment which the administrator has caused to be removed.

************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

To: Avey, Lance[Avey.Lance@epa.gov]
From: Wiese, Carrie
Sent: Thur 9/22/2016 7:30:49 PM
Subject: RE: Results of modeled scoring ranking following SO2 TAD

Hi Lance,

OK, thank you for confirming! This is very helpful as we discuss amongst ourselves and with OPPD our plans to move forward.

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, September 22, 2016 11:12 AM
To: Wiese, Carrie
Subject: RE: Results of modeled scoring ranking following SO2 TAD

Hi Carrie,

Yes, it appears you have your understanding correct. The Whitmore site is the blue tab in the lower right of the image, and OPPD North Omaha is about 1 km to the northwest of the Whitmore tab (and yes the coal pile is a good marker for North Omaha and OPPD's property). And yes, the area referenced to the south as a potential good location is directly due south of the North Omaha Station, just beyond the OPPD property boundary in that direction.

The other blue tab to the northwest does represent the old monitor location. I agree that siting a monitor to the northwest could have issues with interference. Really the only good placement to the northwest may be just across from the OPPD property (I think from the map there is a park over there), but at the same time the modeling results really do not support that location. At one time there was a sense to place a monitor to the northwest as that would a location that would potentially see the downwind impacts of both OPPD and WSEC. But if there are siting interference from trees and the modeling analysis puts more emphasis on the area due south of North Omaha, then I would think the area to the south would be more than justified.

Let me know of any more questions,

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Thursday, September 22, 2016 10:39 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Results of modeled scoring ranking following SO2 TAD

Lance, thanks very much for your assistance with this. Looking at the map with the top 50, I just want to be sure I understand what I'm seeing – it looks like the Whitmore monitor is marked with the blue tab to the lower right/middle, and then North Omaha Station is NW of there (the coal pile appears to be visible, along the river). The area you're referencing to the south as a good placement option would be just west/northwest of Whitmore, and almost due south of North Omaha station?

As for the area to the northwest, I'm not sure but I think the other blue tab may mark our old monitor location that we determined was experiencing too much interference from trees in the area. Is there a strong sense that we would need a monitor to the NW of North Omaha station? It looks like most, if not all, of those areas would experience similar interference as our old monitor.

Thanks again!
Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, September 22, 2016 10:00 AM
To: Wiese, Carrie
Subject: Results of modeled scoring ranking following SO2 TAD

Hi Carrie,

Attached are 2 images of the "scoring" ranking using modeled normalized emissions from OPPD and WSEC. The dots give the locations of the top 50 scoring receptors based on the modeling. The lower the score (i.e., the redder the dots) gives the highest ranked receptors. I also attached the results for the top 100 scoring receptors so you can see the difference as you trim from a top 100 scoring to top 50 scoring. The blue markers on the image give the location of the current Whitmore site and the past site to the northwest that was discontinued in 2010.

You can see the model clusters the best ranked areas just to the south and north of OPPD. Obviously just to the north is the Missouri River, and that area would likely not be able site a monitor. So I would think the areas for a best possible new site are:

1) Just to the south of OPPD, which would be a few blocks to the northwest of the current Whitmore monitor.

2) Somewhere just to northwest of OPPD; somewhere in the top 100 receptors in that area could possible give a good location that is downwind of both OPPD and WSEC.

Lastly I attached the spreadsheet of the results of the top 100 receptors; this is what was provided to Lisa. It gives the location (in UTM coordinates) in Column A and the "Score" in Column F.

Please let me know of questions,

Thanks

Lance

Lance Avey

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avey.lance@epa.gov

To: Avey, Lance[Avey.Lance@epa.gov]
From: Johnson, Matthew [DNR]
Sent: Wed 9/21/2016 5:43:09 PM
Subject: RE: EPA/DNR Cedar Rapids SO2 discussion

Sounds good, here's the conf call:

1-866-685-1580

Ex. 6 - Personal Privacy

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, September 21, 2016 11:52 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Zayudis, Peter [DNR] <Peter.Zayudis@dnr.iowa.gov>
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Thanks for setting this up,

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1) For IPL Prairie Creek, have the modeled emissions rate for Boiler #1,2,3,4 been determined? The protocol I have says TBD. Are they planning to use existing limits, new limits, or actuals?

For boilers 1-3 we are using annual average actual emissions. For boiler 4 we are using a new emission limit based on natural gas that will require compliance in late 2017.

2) For ADM Cedar Rapids, are the five boilers being modeled with actual emissions? The protocol mentions a mix of potential and actuals for ADM sources.

The boilers were modeled using emission rates that are approximately 5-10% higher than the maximum annual average actuals for the period 2012-2014.

3) For Walter Scott, is the nearby OPPD emissions still planning to be modeled using the maximum 1-hr emissions over the most recent 3-yr period? Are OPPD Units 1-3 (which have shutdown) still planned to be modeled as the original protocol states?

We are still deciding how to proceed.

4) For George Neal, since it was designated unclassifiable for the last round, does IDNR plan to submit updated modeling? Since George Neal is still under consideration for the DRR, the most recent years of meteorology and emissions information (2013-2015 instead of 2012-2014) may need to be considered.

We may re-recommend attainment/unclassifiable now that the permits for George Neal North Units 1 & 2 have been rescinded, but there is no need to update the modeling since we used maximum allowable emission rates and 2012-2014 meteorology.

5) The background value to be used is the updated statewide value of 7ug/m3? Some DRR protocols mention the previous 32 ug/m3.

We will be using a background of 7 ug/m^3 because all nearby sources of SO2 are already included in each model. This background concentration is representative of natural background in the absence of local sources of SO2.

Thanks for any information, and please let me know of questions.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

To: Avey, Lance[Avey.Lance@epa.gov]
Cc: McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]
From: Ashton, Brad [DNR]
Sent: Tue 9/20/2016 1:36:29 PM
Subject: RE: DRR modeling questions

Lance,

Please see my responses in bolded red text below.

- Brad

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, September 13, 2016 10:08 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Subject: DRR modeling questions

Hi Brad,

I have a couple questions on the upcoming DRR modeling for some Iowa sources:

1) For IPL Prairie Creek, have the modeled emissions rate for Boiler #1,2,3,4 been determined? The protocol I have says TBD. Are they planning to use existing limits, new limits, or actuals?

For boilers 1-3 we are using annual average actual emissions. For boiler 4 we are using a new emission limit based on natural gas that will require compliance in late 2017.

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Thanks for any information, and please let me know of questions.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

ED_001261_00009601

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 9/14/2016 3:12:29 PM
Subject: RE: OPPD monitoring mxd file
OPPD&WSEC_SO2.abc

This is Breeze's *.amz file, without the max daily files

I sent you the max daily file for the all source group, a very large (>150 MB) file

I also have max daily files for source groups OPPD and WSCE if you want them

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, September 14, 2016 10:02 AM
To: Alam, Lisa
Subject: RE: OPPD monitoring mxd file

Yep! I was just about to respond. It looks like it went through and downloaded without any problems. Can you also send me the file for 4th Highest Max 1-hr averaged over the 3 years? I believe I just have the MAXDAILY file.

Thanks

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, September 14, 2016 9:57 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: OPPD monitoring mxd file

did you receive file?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, September 14, 2016 8:53 AM
To: Alam, Lisa
Subject: RE: OPPD monitoring mxd file

Let's try Google Drive. I need permission to download GSplit and they will hassle me when I ask. Let me know if the Google Drive option gives you problems.

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, September 14, 2016 8:43 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: OPPD monitoring mxd file

The file size is too large on my end –

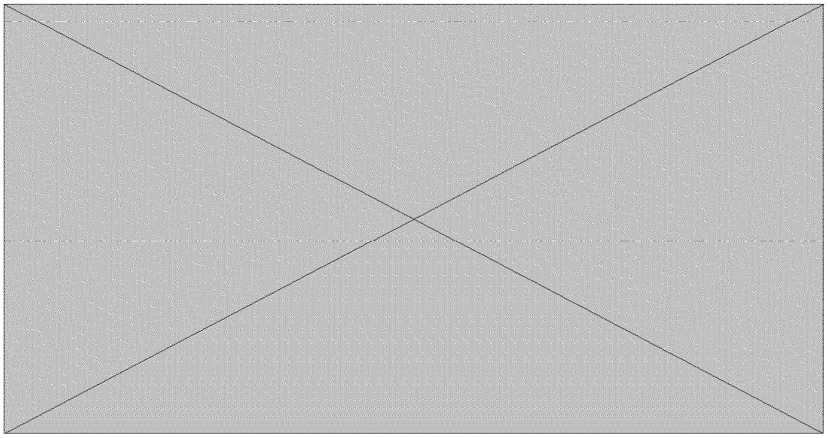
I have two choices

1. Use a file-splitter GSplit

a. http://www.gdgsoft.com/gsplit/

2. Send it through my Google email account – which means I have to use Google Drive. I've never used Google Drive before to share large files, but it shouldn't be too hard

Let me know what you think is best.



****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

Nebraska Department of Environmental Quality (NDEQ)

The Atrium Building, Suite 400, 1200 "N" Street, Lincoln, NE 68508-8922

Phone: 402-471-2925   FAX: 402-471-2909

Website: http://deq.ne.gov Click on "Focus on Air"

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Fri 9/9/2016 5:23:58 PM
Subject: FW: Whelan Energy Center - Proposed SO2 dispersion modeling protocol

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Alam, Lisa
Sent: Wednesday, June 29, 2016 9:23 AM
To: Liebsch, Ed
Subject: RE: Whelan Energy Center - Proposed SO2 dispersion modeling protocol

Ed:

This is a "head's up" and will not affect Whelan's 1-hour SO2 SIP modeling protocol.

Lance Avey, my modeling contact at EPA Region 7 called me yesterday to say that EPA Headquarters has commented on using mixed emissions rates; actuals mixed with PTEs. These folks are lawyers, not engineers, and Lance told me efforts are underway to explain to Headquarters that PTEs are more conservative, and in many cases, all we have for data, and therefore PTEs should suffice, but, it might become necessary to obtain and/or to calculate 2013-15, hourly actuals emission rates, including velocities & temperature for:

Platte Power Station - FID# 58027

Chief - FID#_58049

AGP - FID# 72698

Platte Generating Station

They have hourly SO2 CEMs data, and I can provide you with that data.

Chief

They don't have CEMs data, but I'm happy to process an estimate of actual hourly SO2 data using PTEs, following the outline in the SO2 TAD modeling document.

AGP Soy Processing

I have been told that AGP has hourly SO2 CEMs data, but they are only required to send SO2 quarterly reports to the Department. AGP generally does not enthusiastically cooperate with the NDEQ, and you have a better chance of obtaining hourly SO2 CEMs data with a minimum of hassle if you make a direct request yourself.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Ellis, Todd
Sent: Thursday, June 02, 2016 11:31 AM
To: Alam, Lisa
Subject: FW: Whelan Energy Center - Proposed SO2 dispersion modeling protocol

Maybe no news is good news but I haven't heard a thing about this

From: Liebsch, Ed [mailto:Ed.Liebsch@hdrinc.com]
Sent: Tuesday, May 31, 2016 10:21 AM
To: Alam, Lisa
Cc: Marty Stange; Jason Redding; Ellis, Todd
Subject: RE: Whelan Energy Center - Proposed SO2 dispersion modeling protocol

Lisa,

I'll work with Todd (and AGP if needed) to help refine the AGP inputs.

The only other item I am wanting to discuss further is the possible use of 2014 data for background SO2 concentration. This morning I went into the EPA's AirData database and retrieved the graph below. These are the same data as shown in our earlier analysis last year, and show very obviously that the 2014 data are still bogus (they have not been changed from the earlier data). For 2014, the 99th percentile (4 high daily maximum) of 10 ppb occurred in late July when the instrument was experiencing a large upward zero drift. We can see from the graph below that someone tried to fix the problem in early August, and then again in October.

I believe we "ran to ground" this issue during the prior protocols, with EPA Region 7 and KDHE staff both agreeing that the 2014 data are suspect. I would not want to revert to using bad data for this protocol, as that may imply to some people that the prior protocols were inappropriate regarding the background concentration. However, to provide an updated analysis using the new 2015 data, I propose that we now average the 2012, 2013, and 2015 Trego data for the background 1-hour SO2 for the Whelan analysis.

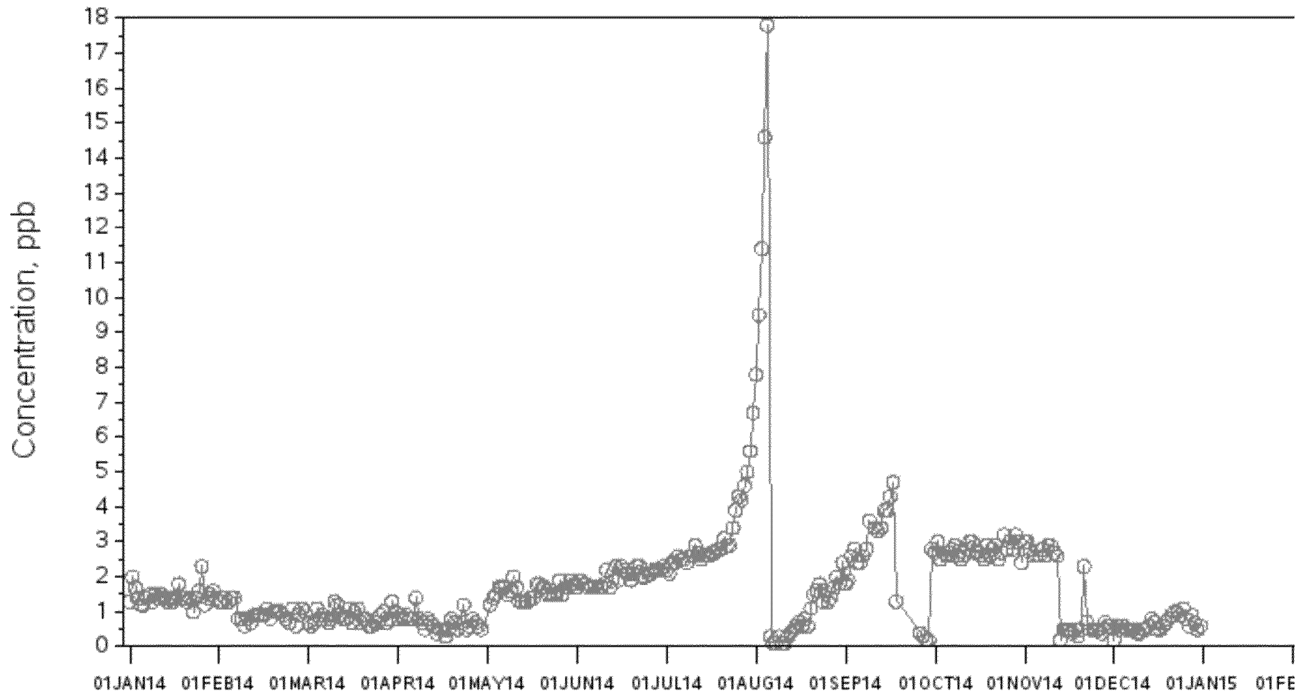
Ed

Ed Liebsch, V.P., Sr. Air Quality Scientist

D: 763-591-5452 **M:** 612-616-3719

Daily Max 1-hour SO2 Concentrations from 01/01/14 to 12/31/14

Parameter: Sulfur dioxide (Applicable standard is 75 ppb)
CBSA:
County: Trego
State: Kansas
AQS Site ID: 20-195-0001, poc 1



Source: U.S. EPA AirData <http://www.epa.gov/airdata>
Generated: May 31, 2016

The following data link is active for the next 10 minutes, after which you must resubmit your query.
Download CSV (spreadsheet)

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Friday, May 27, 2016 11:00 AM
To: Liebsch, Ed
Cc: Marty Stange; Jason Redding; Ellis, Todd
Subject: RE: Whelan Energy Center - Proposed SO2 dispersion modeling protocol

Ed:

I've reviewed and made a few minor comments on the protocol you sent me, attached. The goal is to have a solid protocol that EPA Region 7 will approve without comments or changes. Below is a summary of those comments and our phone call discussion yesterday. As briefly discussed on the phone, SIP modeling is different from Construction Permit compliance modeling, and I'm still working my way up the learning curve.

The result of appropriate and sufficient modeling can establish air quality data for comparison to the 1-hour SO2 NAAQS for the purposes of **area designations**; attainment, nonattainment, or unclassifiable. While Whelan is your client, the nearby facilities benefit by being modeled at the same time, and it benefits all facilities in the Hastings area to cooperate to demonstrate an **area attainment designation** for the 1-hour SO2 NAAQS. A nonattainment **area designation** will have an effect on all facilities in that area.

CEMs data for AGP

Todd Ellis tells me AGP has CEMs data, but they are not required to give NDEQ hour by hour data, only quarterly data summaries, so we don't have those values we can give to you. We can request their records, but it would probably be a better idea to talk directly to Kelly Jorgensen and request the records yourself. Additionally, Todd can give you more information about AGP's CEMs data, so I would start by calling Todd. I told him you would be calling him next week and he is expecting to hear from you.

Todd Ellis

Environmental Section Supervisor

(402) 471-4561

todd.ellis@nebraska.gov

I can't remember, but do you need actual SO2 emissions from Chief as well? Chief doesn't have a CEM, and so actual emissions are estimated using coal throughput values.

Receptor Grid

A finer receptor grid around Platte Generating Station is reasonable and justifiable.

-

Met files

Grand Island-Omaha upper air, met years 2013-15, sent yesterday. Can't use **Hastings, NE** met data because of missing 2013 1-minute ASOS wind data

1-Hour SO2 Background

The 3 years used to provide a background concentration should be consistent with the 3 years of emissions data and met data as well. You told me you have concerns about an apparent "drift" in the 2014 concentration value at Trego, KS 1-hour SO2 monitor. The value for 2014 does appear to be an outlier, although the State of KS Dept. of Health and Environment has told me that they stand by this value.

1-hour SO2
99th percentile

Year	**ppb**
2011	3
2012	4
2013	3
2014	10
2015	4

Trego, KS 1-hour 99th percentile background

µg/m^3	**ppb**	**period**
14.9	5.7	2013-15
8.6	3.3	2011-13

Using 2013-15, the 1-hour SO2 background concentration is more that 50% higher than the 2011-13 value you have proposed in the protocol.

There are two SO2 monitors located in Iowa that conform to the 2013-15 time period, and reflect realistic regional SO2 background concentrations. One in Des Moines, the other in Van Buren County, locations are in the IA SO2.kmz file, attached.

The 2013 through 2015 Iowa 1-hour 99% 3-year average SO2 background are listed below.

Monitor Values Report

https://www3.epa.gov/airdata/ad_rep_mon.html,

ppb	ug/m3	Location
1.3	3.4	Des Moines, IA
3.0	7.8	Van Buren Co., IA

Hopefully, when I return from vacation on June 6th, we will be able to quickly solidify the protocol and send it to EPA Region 7.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Liebsch, Ed [mailto:Ed.Liebsch@hdrinc.com]
Sent: Monday, May 23, 2016 5:22 PM
To: Alam, Lisa
Cc: Marty Stange; Jason Redding
Subject: Whelan Energy Center - Proposed SO2 dispersion modeling protocol

Lisa,

Please find attached for NDEQ review and approval the proposed SO2 modeling protocol for the Whelan Energy Center. Sorry for the delay in getting this to you. Hopefully it is an easy review as we've tried to be consistent, where it makes sense, with the prior approved protocols.

Please let me know at your earliest convenience if you see any need for changes, and if so, we can quickly get appropriate revisions made and re-submitted.

Ed

Ed Liebsch, V.P.

Senior Air Quality Scientist

HDR

701 Xenia Avenue South, Suite 600
Minneapolis, MN
D 763.591.5452 **M** 612.616.3719
ed.liebsch@hdrinc.com

hdrinc.com/follow-us

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Thur 9/8/2016 9:34:34 PM
Subject: RE: Justification Document for DRR
removed.txt

Yes! Thanks Lance!

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, September 08, 2016 4:07 PM
To: Alam, Lisa
Subject: RE: Justification Document for DRR

Did the attached document detailing Brad's analysis go through this time?

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Thursday, September 08, 2016 4:01 PM

To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Justification Document for DRR

Lance:

For some reason my email client removed the images - very odd

Could you resend as a zip file, with *.abc as the extension?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, September 08, 2016 3:49 PM
To: Alam, Lisa
Subject: FW: Justification Document for DRR

Forwarding Brad's analysis.

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Wednesday, September 07, 2016 11:04 AM
To: Avey, Lance <Avey.Lance@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Wiese, Carrie <carrie.wiese@nebraska.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Hamilton, Heather <Hamilton.Heather@epa.gov>
Subject: Justification Document for DRR

All,

I am providing the attached document in advance of tomorrow's call to discuss the Omaha/Council Bluffs SO2 DRR work. The document includes the Iowa DNR's justification for considering the two areas separately under the DRR, and is based on the additional technical analyses we discussed during our previous call.

Carrie,

Please distribute this information to anyone else at NDEQ that will be joining us on the call tomorrow.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Thur 9/8/2016 9:00:54 PM
Subject: RE: Justification Document for DRR
removed.txt

Lance:

For some reason my email client removed the images - very odd

Could you resend as a zip file, with *.abc as the extension?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, September 08, 2016 3:49 PM
To: Alam, Lisa
Subject: FW: Justification Document for DRR

Forwarding Brad's analysis.

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Wednesday, September 07, 2016 11:04 AM
To: Avey, Lance <Avey.Lance@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Wiese, Carrie <carrie.wiese@nebraska.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Hamilton, Heather <Hamilton.Heather@epa.gov>
Subject: Justification Document for DRR

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- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

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WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: Avey, Lance[Avey.Lance@epa.gov]; Hawkins, Andy[hawkins.andy@epa.gov]; Wiese, Carrie[carrie.wiese@nebraska.gov]
Cc: McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; Hamilton, Heather[Hamilton.Heather@epa.gov]
From: Ashton, Brad [DNR]
Sent: Wed 9/7/2016 4:04:06 PM
Subject: Justification Document for DRR
removed.txt
Seperate Area Justification.docx

All,

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Please distribute this information to anyone else at NDEQ that will be joining us on the call tomorrow.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

	Iowa Department of Natural Resources
	P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov
	Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324
	www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: Hamilton, Heather[Hamilton.Heather@epa.gov]; Avey, Lance[Avey.Lance@epa.gov]; 'Wiese, Carrie'[carrie.wiese@nebraska.gov]; Wharton, Tracy[tracy.wharton@nebraska.gov]; Hawkins, Andy[hawkins.andy@epa.gov]; Peter, David[peter.david@epa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]
Cc: Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]
From: Johnson, Matthew [DNR]
Sent: Thur 9/1/2016 12:39:29 PM
Subject: RE: call to discuss Omaha/Council Bluffs SO2 DRR work - 9/8/16, 9 am
removed.txt

We already have the call in number:

1-866-685-1580

Ex. 6 - Personal Privacy

From: Hamilton, Heather [mailto:Hamilton.Heather@epa.gov]
Sent: Thursday, September 01, 2016 7:30 AM
To: Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; Avey, Lance <Avey.Lance@epa.gov>; 'Wiese, Carrie' <carrie.wiese@nebraska.gov>; Wharton, Tracy <tracy.wharton@nebraska.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Peter, David <peter.david@epa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Cc: Algoe-Eakin, Amy <Algoe-Eakin.Amy@epa.gov>
Subject: RE: call to discuss Omaha/Council Bluffs SO2 DRR work - 9/8/16, 9 am

I will get a call-in number – stay tuned.

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Wednesday, August 31, 2016 3:52 PM
To: Avey, Lance <Avey.Lance@epa.gov>; 'Wiese, Carrie' <carrie.wiese@nebraska.gov>; Wharton, Tracy <tracy.wharton@nebraska.gov>; Hamilton, Heather <Hamilton.Heather@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Peter, David <peter.david@epa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; brad.ashton@dnr.iowa.gov; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Cc: Algoe-Eakin, Amy <Algoe-Eakin.Amy@epa.gov>
Subject: RE: call to discuss Omaha/Council Bluffs SO2 DRR work - 9/8/16, 9 am

Time confirmed, thank you everyone.

Thursday September 8, 2016, 9:00 am (CDT)

We'll use the Iowa DNR Conf Call Line:

1-866-685-1580

Ex. 6 - Personal Privacy

MATTHEW JOHNSON, Long Range Planning & Regional Modeling

Iowa Department of Natural Resources

P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Wednesday, August 31, 2016 2:40 PM
To: Hamilton, Heather <Hamilton.Heather@epa.gov>
Cc: Avey, Lance <Avey.Lance@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Peter, David <peter.david@epa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; brad.ashton@dnr.iowa.gov; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Carrie Wiese (carrie.wiese@nebraska.gov) <carrie.wiese@nebraska.gov>; Tracy Wharton (tracy.wharton@nebraska.gov) <tracy.wharton@nebraska.gov>
Subject: call to discuss Omaha/Council bluffs SO2 DRR work

Hello Heather (and all),

We've spoken with Nebraska and provided an update regarding the1-hour SO2 modeling analyses we've conducted for Walter Scott and OPPD for the data requirement rule. We'd like to have a NE/IA/EPA R7 call to discuss the results. Assuming our planning call next week won't take the full 1.5 hours, would EPA R7 be available for this call at 10 am Wed September 7?

Thanks,

Matthew

To: 'Johnson, Matthew [DNR]'[Matthew.Johnson@dnr.iowa.gov]; Avey, Lance[Avey.Lance@epa.gov]; 'Wiese, Carrie'[carrie.wiese@nebraska.gov]; Wharton, Tracy[tracy.wharton@nebraska.gov]; Hawkins, Andy[hawkins.andy@epa.gov]; Peter, David[peter.david@epa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]
Cc: Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]
From: Hamilton, Heather
Sent: Thur 9/1/2016 12:29:52 PM
Subject: RE: call to discuss Omaha/Council Bluffs SO2 DRR work - 9/8/16, 9 am

I will get a call-in number – stay tuned.

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Wednesday, August 31, 2016 3:52 PM
To: Avey, Lance <Avey.Lance@epa.gov>; 'Wiese, Carrie' <carrie.wiese@nebraska.gov>; Wharton, Tracy <tracy.wharton@nebraska.gov>; Hamilton, Heather <Hamilton.Heather@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Peter, David <peter.david@epa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; brad.ashton@dnr.iowa.gov; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>
Cc: Algoe-Eakin, Amy <Algoe-Eakin.Amy@epa.gov>
Subject: RE: call to discuss Omaha/Council Bluffs SO2 DRR work - 9/8/16, 9 am

Time confirmed, thank you everyone.

Thursday September 8, 2016, 9:00 am (CDT)

We'll use the Iowa DNR Conf Call Line:

1-866-685-1580

Ex. 6 - Personal Privacy

MATTHEW JOHNSON, Long Range Planning & Regional Modeling
Iowa Department of Natural Resources
P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Wednesday, August 31, 2016 2:40 PM
To: Hamilton, Heather <Hamilton.Heather@epa.gov>
Cc: Avey, Lance <Avey.Lance@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Peter, David <peter.david@epa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; brad.ashton@dnr.iowa.gov; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Carrie Wiese (carrie.wiese@nebraska.gov) <carrie.wiese@nebraska.gov>; Tracy Wharton (tracy.wharton@nebraska.gov) <tracy.wharton@nebraska.gov>
Subject: call to discuss Omaha/Council bluffs SO2 DRR work

Hello Heather (and all),

We've spoken with Nebraska and provided an update regarding the1-hour SO2 modeling analyses we've conducted for Walter Scott and OPPD for the data requirement rule. We'd like to have a NE/IA/EPA R7 call to discuss the results. Assuming our planning call next week won't take the full 1.5 hours, would EPA R7 be available for this call at 10 am Wed September 7?

Thanks,

Matthew

To: Avey, Lance[Avey.Lance@epa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; Hamilton, Heather[Hamilton.Heather@epa.gov]
Cc: Hawkins, Andy[hawkins.andy@epa.gov]; Peter, David[peter.david@epa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]; Wharton, Tracy[tracy.wharton@nebraska.gov]; Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]
From: Wiese, Carrie
Sent: Wed 8/31/2016 8:13:40 PM
Subject: RE: call to discuss Omaha/Council bluffs SO2 DRR work

It looks like Thursday could also work for us before 11:00 a.m.

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, August 31, 2016 3:10 PM
To: Johnson, Matthew [DNR]; Hamilton, Heather
Cc: Hawkins, Andy; Peter, David; McGraw, Jim [DNR]; brad.ashton@dnr.iowa.gov; Krzak, Jennifer [DNR]; Wiese, Carrie; Wharton, Tracy; Algoe-Eakin, Amy
Subject: RE: call to discuss Omaha/Council bluffs SO2 DRR work

Hi Matthew,

The one day next week that does not work for me (or Andy) would be Sept. 7. Would Tuesday (6th) or Thursday (8th) work?

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Wednesday, August 31, 2016 2:40 PM
To: Hamilton, Heather <Hamilton.Heather@epa.gov>
Cc: Avey, Lance <Avey.Lance@epa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>; Peter, David <peter.david@epa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; brad.ashton@dnr.iowa.gov; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Carrie Wiese (carrie.wiese@nebraska.gov) <carrie.wiese@nebraska.gov>; Tracy Wharton (tracy.wharton@nebraska.gov) <tracy.wharton@nebraska.gov>
Subject: call to discuss Omaha/Council bluffs SO2 DRR work

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Thanks,

Matthew

To: Hamilton, Heather[Hamilton.Heather@epa.gov]
Cc: Avey, Lance[Avey.Lance@epa.gov]; Hawkins, Andy[hawkins.andy@epa.gov]; Peter, David[peter.david@epa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]; Carrie Wiese (carrie.wiese@nebraska.gov)[carrie.wiese@nebraska.gov]; Tracy Wharton (tracy.wharton@nebraska.gov)[tracy.wharton@nebraska.gov]
From: Johnson, Matthew [DNR]
Sent: Wed 8/31/2016 7:39:45 PM
Subject: call to discuss Omaha/Council bluffs SO2 DRR work

Hello Heather (and all),

We've spoken with Nebraska and provided an update regarding the1-hour SO2 modeling analyses we've conducted for Walter Scott and OPPD for the data requirement rule. We'd like to have a NE/IA/EPA R7 call to discuss the results. Assuming our planning call next week won't take the full 1.5 hours, would EPA R7 be available for this call at 10 am Wed September 7?

Thanks,

Matthew

To: Grooms, Leland[Grooms.Leland@epa.gov]; Crable, Gregory[Crable.Gregory@epa.gov]; Peter, David[peter.david@epa.gov]; Avey, Lance[Avey.Lance@epa.gov]
Cc: Stoner, Kevin J[kevin.j.stoner@nebraska.gov]; Ellis, Todd[todd.ellis@nebraska.gov]; chris.hetzler@nebraska.gov[chris.hetzler@nebraska.gov]; Chris M. Schroeder (cschroeder@lincoln.ne.gov)[cschroeder@lincoln.ne.gov]; Jim S. Fobben (jfobben@lincoln.ne.gov)[jfobben@lincoln.ne.gov]; jim.yeggy@nebraska.gov[jim.yeggy@nebraska.gov]; Wharton, Tracy[tracy.wharton@nebraska.gov]
From: Wiese, Carrie
Sent: Tue 8/30/2016 6:38:06 PM
Subject: RE: Nebraska 2016 Ambient Air Monitoring Network Plan (Final 062816)
NR062816f Attachment E - Sheldon SO2 Site (revised).pdf

Good afternoon,

Attached, please find per request the amended Attachment E for Nebraska's 2016 Ambient Air Monitoring Network Plan. We will also send, via mail to Lance Avey, modeling files as discussed in this amended attachment.

Pending resolution of other concerns regarding the proposed monitoring site for North Omaha station, we also intend to send a revised version of Attachment F in the future.

Please let me know if you have any questions.

Thanks,

Carrie

Carrie Wiese

Carrie Wiese

Supervisor – Air Quality Grants, Planning and Outreach Unit

Nebraska Department of Environmental Quality

1200 N Street, Suite 400

Lincoln, NE 68508

(402)471-6624, carrie.wiese@nebraska.gov

From: Yeggy, Jim
Sent: Wednesday, June 29, 2016 12:05 PM
To: Grooms.Leland@epamail.epa.gov; Crable.Gregory@epamail.epa.gov
Cc: Schneider, Shelley; Ellis, Todd; Hetzler, Chris; Russ Haden ; Chris M. Schroeder (cschroeder@lincoln.ne.gov); Wiese, Carrie; Jim S. Fobben (jfobben@lincoln.ne.gov)
Subject: Nebraska 2016 Ambient Air Monitoring Network Plan (Final 062816)

Leland and Gregory,

Three documents are attached:

NR062816f.pdf – Nebraska 2016 Ambient Air Monitoring Network Plan (Final 062816)

NR062816CmtResp.pdf – Comment response documentation; documents all changes between public inspection draft and final

NR062916CvrLtr.pdf – Submittal letter signed by AQD Administrator Shelley Schneider dated 6/29/16

Please distribute as needed for review. Questions can be directed to me, except Part 51 DRR issues should be directed to Carrie Wiese.

Thanks

Jim Yeggy, Program Specialist

NDEQ AQD Compliance Section

402/202-0272 cell

402/471-2142 office

Nebraska 2016 Ambient Air Monitoring Network Plan
Attachment E: NPPD Sheldon Station DRR Monitoring Site Proposal
Amended August 2016

Introduction

On August 21, 2015 EPA finalized changes to 40 CFR Part 51 Subpart BB, §51.1200 - §51.1205 (a.k.a. the Data Requirements Rule or DRR). The DRR requires air agencies to provide data to characterize current air quality in areas surrounding sources of SO_2 emitting 2,000 tpy or more, to identify maximum 1-hour concentrations of SO_2 in ambient air. To address these requirements, air agencies may either submit modeling or monitoring data in the areas of DRR-affected sources, or assign permit limits to these sources. Nebraska Public Power District (NPPD)'s Sheldon Station near Hallam, NE is one of the DRR-affected sources for which NDEQ proposes to submit monitoring data to satisfy the requirements of the DRR.

Site Selection

Emission Sources

The only major SO_2 emission source in the vicinity of Sheldon Station is Sheldon Station itself, located in a rural area near Hallam, NE. Sheldon Station is a coal-fired electrical generating unit (EGU) capable of generating 225 megawatts of electricity.

Based on annual Acid Rain Program data over the past 10 years, Sheldon Station's total SO_2 emissions (for Units 1 and 2) have ranged from approximately 2,600 tpy to 5,400 tpy with the average being approximately 3,800 tpy. For 2015, the Units 1 and 2 total SO_2 emissions were 2,598 tons. Figure E-1 shows these data, demonstrating an overall downward trend in SO_2 emissions.

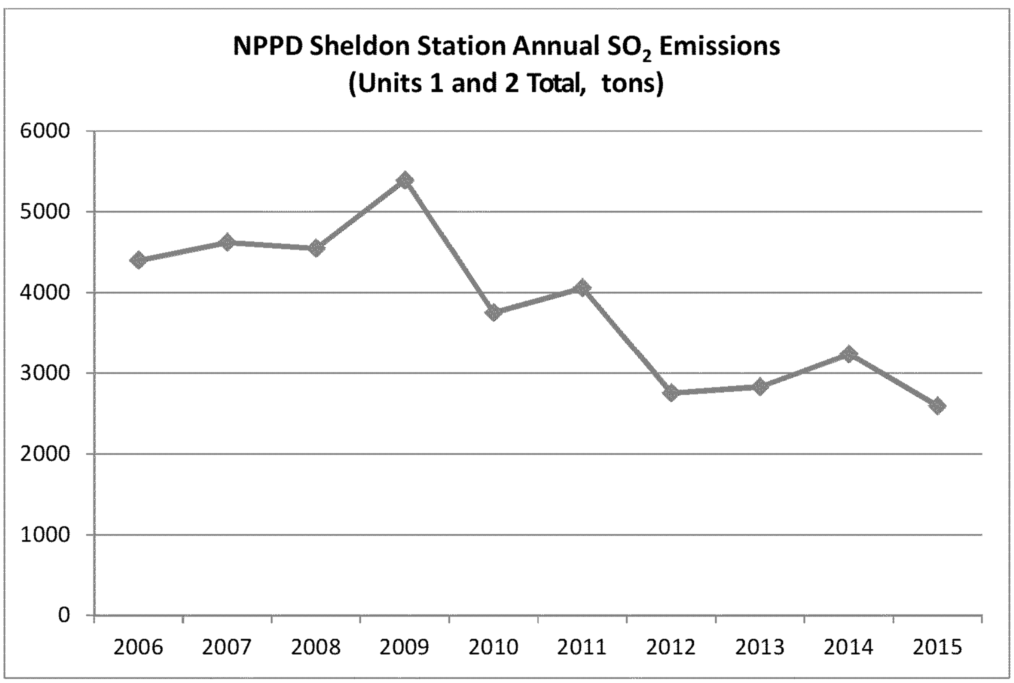


Figure E-1: NPPD Sheldon Station Annual SO_2 Emissions

Quarterly Acid Rain Program data from the past 10 years indicate that, in general, the highest SO_2 emissions from the facility occur during the 3rd quarter. This is to be expected during the hottest months of the year due to increased demand on power stations for cooling needs. Figure E-2 demonstrates these trends.

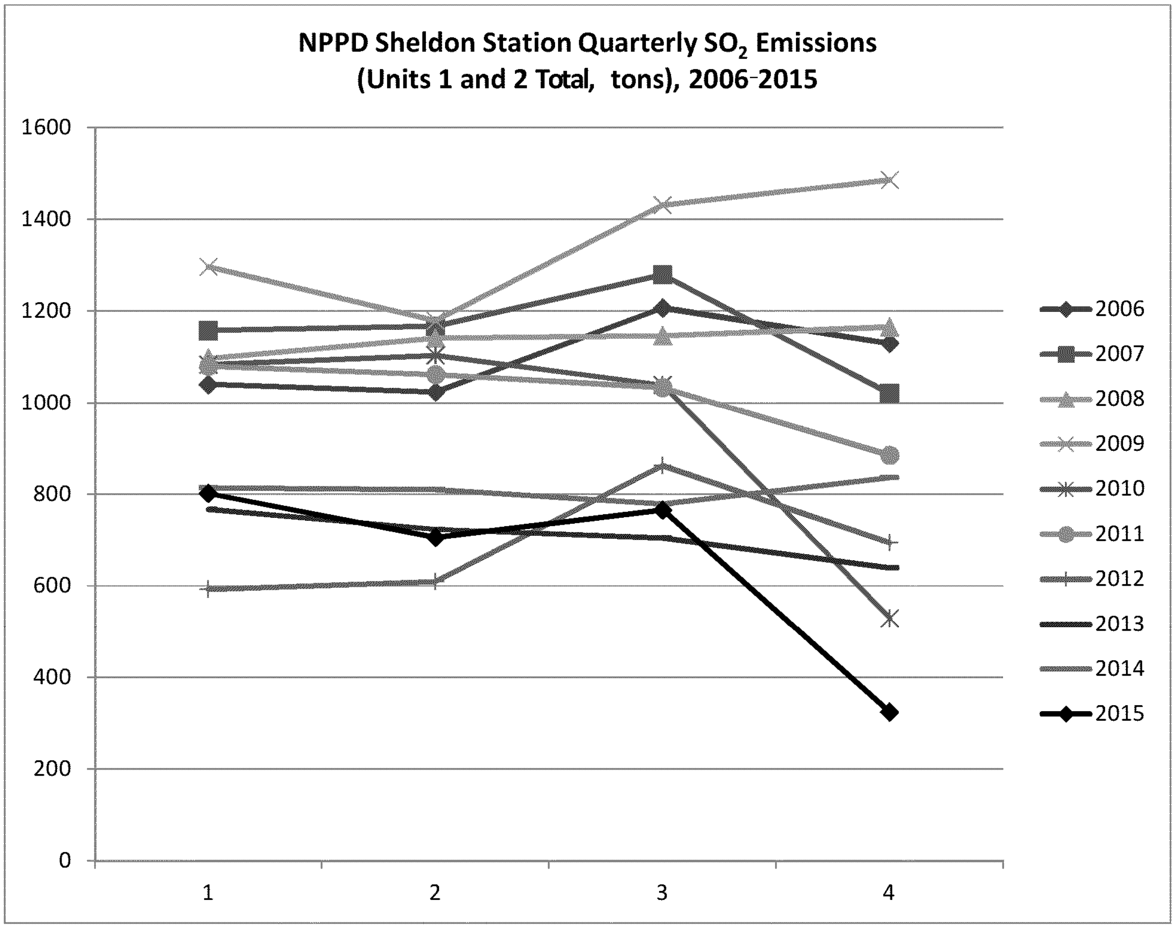


Figure E-2: NPPD Sheldon Station Quarterly SO_2 Emissions

As of this writing, NPPD is in the process of raising the stacks on both Units 1 and 2. According to PSD permit modifications effective April 15, 2016, NPPD ceased operation of both units at Sheldon Station on April 18, 2016 until stack construction is completed, with the stack height at Unit 1 scheduled to be completed by July 2, 2016 per a consent order between NDEQ and NPPD. Modeling conducted to help determine necessary stack heights to, at a minimum, ensure attainment with the 2010 1-hour SO_2 NAAQS was conducted by NPPD's consultant – HDR, Inc. – and is discussed below in *Existing Modeling*.

Additionally, NPPD has entered partnership with Monolith Materials – soon to be building a natural gas-based carbon black production facility adjacent to Sheldon Station – to utilize hydrogen, a co-product of Monolith's carbon black process, to replace coal as a fuel source for Unit 2 at Sheldon Station with an expected completion date for the conversion by the end of 2019. Conversion of Unit 2 to hydrogen fuel will essentially eliminate SO_2 (and other) emissions from this unit. Upon assessing the success of conversion at Unit 2 and sufficient hydrogen supply from Monolith, NPPD also intends to convert Unit 1 to hydrogen fuel in the following years.

Existing Air Quality Data

There are no previous or existing SO_2 monitors in the vicinity of Sheldon Station.

Modeling

While conducting modeling in support of determining necessary stack heights at Sheldon Station, HDR, Inc. produced maps showing the areas receiving the highest levels of SO_2 from Sheldon Station, following the completion of the stack height adjustments at Units 1 and 2. The model was based on the extended stack heights as well as actual hourly emissions data, reflecting actual measured stack exhaust temperatures and exhaust flows and thus best representing where plumes have maximum impact at ground level. The modeling protocol was developed to be consistent with the DRR modeling TAD, and is included at the end of this attachment. Figures E-3 and E-4 show these areas in relation to the location of Sheldon Station and greater detail of the area modeling the highest SO_2 concentrations as it overlaps NPPD-owned and adjacent private property, respectively.

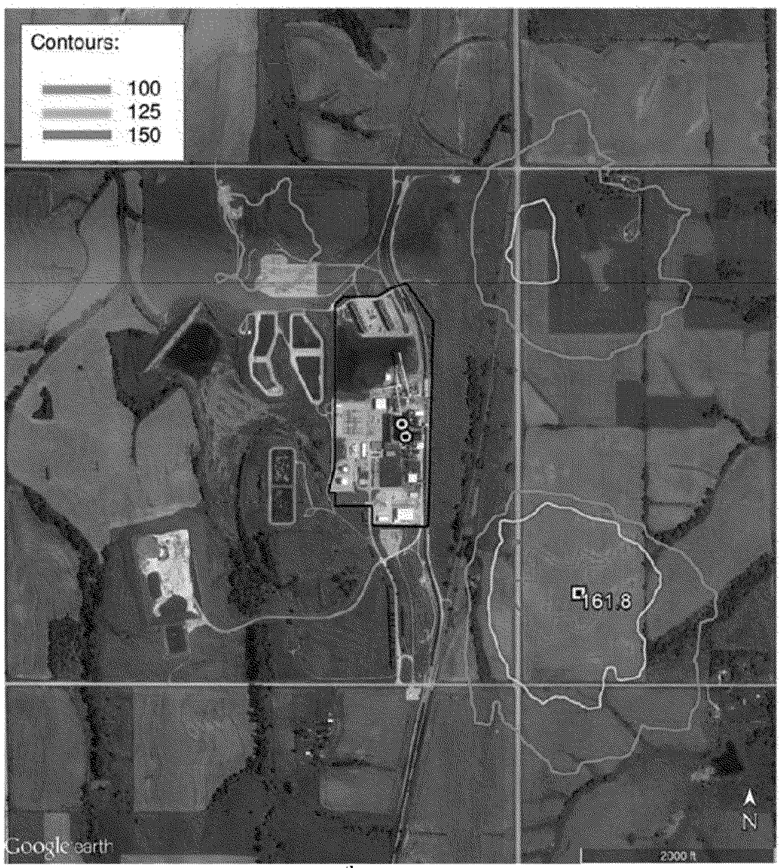


Figure E-3: Contour Plot of SO2 1-Hour (4th high daily max) Modeled Concentrations ($\mu g/m^3$)[1]

Figure E-4: Close-up of Highest Modeled SO_2 Impact Area, NPPD Sheldon Station

Following original submission of the network monitoring plan (and this attachment) to EPA on June 29, 2016, NDEQ was contacted by EPA and instructed to produce a ranking analysis similar to that found in the Georgia Department of Natural Resources 2016 Ambient Air Monitoring Plan (available online at http://amp.georgiaair.org/docs/2016%20Ambient%20Air%20Monitoring%20Plan.pdf). This included additional air dispersion modeling.

The dispersion modeling procedures used in this additional study were consistent with the approved modeling protocol at the end of this attachment. That modeling was based on stack heights of 224 feet for Unit 1 and 210 feet for Unit 2 which were in the process of being extended at the time, and will be installed by the start date for ambient air SO_2 monitoring[1].

The only difference in the AERMOD dispersion model inputs for this monitor siting analysis, compared to the referenced compliance dispersion modeling with results shown in Figures E-3 and E-4, is that the updated modeling used a smaller receptor grid with coarser grid spacing. For practical reasons, the receptor grid size was reduced from that used in the compliance modeling, due to the volume of model output that would be produced for the monitor siting analysis. The earlier modeling used a receptor grid extending out to 10 km from the facility, and contained over 6,000 receptors. The recommended dispersion modeling for monitor siting requires that the AERMOD model produce a separate output file using the MAXDAILY option. The MAXDAILY option writes the daily maximum 1-hour concentration for each receptor to this output file. Given over 6,000 receptors and

[1] HDR Engineering, Inc. (2016, July 29). *Sulfur Dioxide Monitor Siting Report for Sheldon Station (Facility ID #33563) Hallam, Nebraska.*

1096 days (three years) of meteorological data, this would produce a file that would be over 7 million lines long, far too big to import and sort using Excel spreadsheet software[1].

Given that this analysis is focused only on areas relatively near Sheldon Station, where the prior modeling indicated the highest concentrations, the receptor grid was reduced to just fence line receptors and to a Cartesian grid of 100-meter spacing receptors, extending out to 1 kilometer from the facility. The receptor grid, containing 757 receptors, is shown in Figure E-5. This grid encompasses the area where the prior modeling indicated the maximum concentrations would occur. A plot of those predictions from the prior modeling of actual hourly emissions is shown in Figure E-3. The receptor grid used for this monitor siting analysis also included a receptor at a location identified as having suitable access (land owned by NPPD) and power availability nearby, which is also near the area of maximum predicted impacts shown in Figure E-3[1].

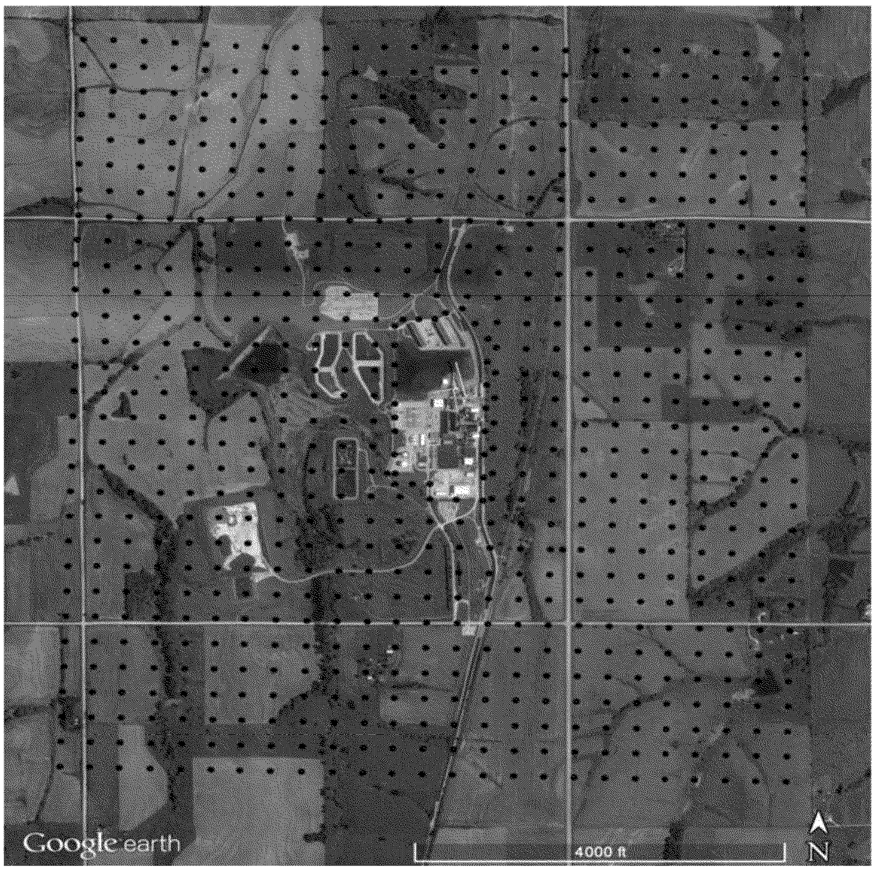


Figure E-5: Receptor Locations for Monitor Siting Modeling Analysis[1]

The MAXDAILY output file produced by AERMOD was analyzed using Excel spreadsheet formulae to determine, for each modeled day of meteorology, the receptor with the maximum modeled 1-hour SO_2 concentration on that day. This gave a total database extraction of 1096 1-hour episodes (number of days in three years, with 2012 being a leap year). These data were then sorted by receptor, and then the count of maximum 1-hour days for each receptor was tabulated. The receptors were then ranked in descending order of the number of daily maximum 1-hour values. These data are summarized in Table E-1.[1]

The locations of the ranked receptors listed in Table E-1 are shown in Figure E-6. The siting concerns for locations ranked higher than the proposed location are also listed in Table E-1. Many of these locations, while their count of the number of highest daily 1-hour impact is greater than the proposed location, actually have lower predicted design value (4th high) concentrations than the preferred location.[1]

Table E-1: Ranking of Receptors and Proposed Monitor Location[1]

Receptor Score Rank	Daily High Count	Modeled Conc. (µg/m3) 1st High	Modeled Conc. (µg/m3) 4th High	Latitude North	Longitude West	Siting Concern
1	28	145.19	110.89	40.563923	96.788715	Low concentrations, within substation
2	24	177.26	153.38	40.554740	96.779569	Farm field, access issues, no power
3	21	190.06	160.39	40.554717	96.778389	Farm field, access issues, no power
4	21	102.66	88.23	40.566556	96.785085	Low concentrations
5	19	168.15	143.08	40.553862	96.780779	Lower concentrations than preferred location
6	19	156.20	123.95	40.562819	96.778121	Low concentrations, farm field, access issues, no power
7	18	159.98	130.94	40.564642	96.779242	Low concentrations, farm field, access issues, no power
8	18	155.20	129.02	40.563742	96.779272	Low concentrations, farm field, access issues, no power
9	14	193.98	142.84	40.556517	96.778330	Farm field, access issues, no power
10	**14**	**189.95**	**152.63**	**40.554753**	**96.780278**	**Proposed monitor location**

There are only two receptors that have higher design value concentrations than the proposed monitor location (see Figure E-7), and both of these receptors are in a farm field that would have land access concerns, and would need a power transmission line to either of the sites. The modeled design value concentrations at those two locations are only slightly higher than at the proposed monitor site, the highest being only about 5% higher than at the proposed monitor location.[1]

ons

Meteorological Data

Relevant meteorological data has been taken into consideration in the modeling conducted by HDR, Inc., as outlined below in the modeling protocol utilized by HDR.

Geographic Influences

While there is some relief in the vicinity of Sheldon Station, the overall landscape of this part of the state is generally flat, i.e., there are no mountain ranges or other geographic characteristics of the area that would greatly influence dispersion. Any geographic influence has been accounted for in the modeling conducted by HDR, Inc., as outlined below in the modeling protocol utilized by HDR.

Site Determination

Because modeling conducted by HDR, Inc. maps areas of greatest influence from SO_2 emissions from Sheldon Station, NDEQ was able to narrow down possible monitoring site locations with relative ease. When also considering that the area of highest influence is modeled to overlay a portion of NPPD property where power to the monitoring station is feasible and access is fairly simple, determination of a monitoring site to meet DRR requirements for Sheldon Station is straightforward. It is also noted that the modeled SO_2 concentration at the edge of NPPD's property is only 4.5 $\mu g/m^3$ lower than the highest modeled concentration.

NDEQ therefore proposes the installation of an SO_2 monitor within the cross-hatched area on the west side of the road in Figure E-7, on NPPD property.

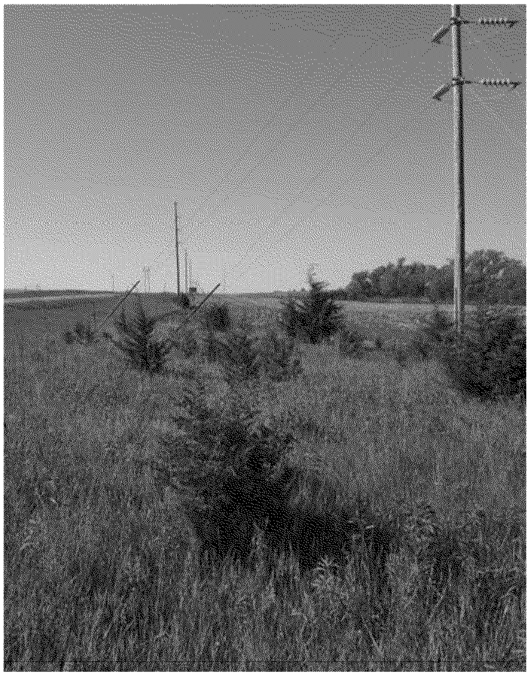
The proposed site is fairly level and poses no major concerns for placement of the monitor and supporting equipment. There are power lines and associated guy wires present in the vicinity, but proper placement of the monitor trailer will prevent concerns associated with these. Figure E-8 provides photos of the proposed site and its surroundings.

Proposed monitoring site as seen from county road east of Sheldon Station (view looking west)

View looking north from proposed monitoring site for Sheldon Station

View looking east from proposed monitoring site for Sheldon Station

Figure E-8: Photos of proposed monitoring site for Sheldon Station (continued on following page)



View looking south from proposed monitoring site for Sheldon Station

View looking toward Sheldon Station (northwest) from proposed monitoring site

Figure E-8 (cont'd): Photos of proposed monitoring site for Sheldon Station

Because Sheldon Station is the only major SO_2 source in the vicinity and is in a rural area with limited impact on human health in the vicinity, the NDEQ feels confident that the single proposed monitoring location will suffice to satisfy DRR needs. Further, given the expected drastic reduction and possible near-elimination of SO_2 emissions from this facility, in addition to stack height extensions already underway, NDEQ feels that additional investment in installing monitors for this source would be an unwise expenditure of limited funding.

While fine details are yet to be determined, it is expected at this time that NDEQ will provide funds to Lincoln-Lancaster County Health Department (LLCHD) through their Section 105 agreement to partially cover capital costs for installation of this monitor, with the remainder of expenses being covered by LLCHD and NPPD. It is anticipated that LLCHD will operate the monitor and bear associated operation and maintenance costs with further assistance from NDEQ as funds allow.

Nebraska 2016 Ambient Air Monitoring Network Plan
Attachment E: NPPD Sheldon Station DRR Monitoring Site Proposal
Amended August 2016

Proposed SO_2 Monitoring Site: Additional Information and Part 58 Compliance Review

The proposed SO_2 monitoring location is to be a micro-scale, source-oriented site with respect to NPPD's Sheldon Station, a coal-fired electrical generating unit north of Hallam, NE. The site is in a rural area of Lancaster County in a grassed area on NPPD property. It is west and adjacent to SW 42nd Street and approximately 935 feet north of W Pella Road. The approximate Lat/Long coordinates are 40° 33' 17" N and 96° 46' 49" W. The location of the proposed site is shown in Figure E-5. Also see photos of site location in Figure E-6.

The proposed site will meet applicable requirements of 40 CFR Part 58. A compliance review with respect to Part 58 Appendixes A thru E is provided below.

Appendix A - QA Requirements for Monitors used for NAAQS Evaluations: LLCHD will operate the site, and NDEQ will provide technical and audit support. Both agencies have experience operating gaseous samplers and meeting Appendix A QA requirements. Operating, maintenance and QA requirements will comply with the requirements of the *Quality Assurance Project Plan (QAPP)for the Nebraska Ambient Air Monitoring Program for Criteria Pollutants, NCore Parameters, $PM_{2.5}$ Speciation and Total Reduced Sulfur* (EPA approved 11/24/14).

Appendix B - QA Requirements for PSD Monitors: Not applicable. This will not be a PSD air monitoring site.

Appendix C – Ambient Air Quality Monitoring Methodology: The proposed site will utilize a continuous FEM SO_2 analyzer capable of taking 1-minute SO_2 readings.

Other equipment will include a data logger or computer capable of storing the 1-minute analyzer data; and two sets of calibration equipment (i.e., a calibrator, a zero air system and EPA-protocol SO_2 calibration gas). One set is for annual calibration and biweekly zero/span/precision checks and the other is for audits.

The make and model of the FEM analyzer, calibrator and zero air system have not been finalized. The FEM analyzer will be either purchased as a new unit or be no more than 5 years old. The calibrator and zero air system used will meet the specifications required for the FEM analyzer. All equipment will meet 40 CFR Part 58 Appendix C requirements.

Analytical equipment will be housed in a temperature-controlled enclosure that maintains interior temperatures between 20° to 30° C.

Appendix D – Network Design Criteria: Modeling was performed to identify the highest concentration area for the site. The proposed location meets the criteria for a microscale site as set forth in Appendix E Section 4.4.

Appendix E - Probe and Monitoring Path Siting Criteria: The preliminary site review sheet (below) demonstrates that the site will meet Appendix E requirements.

Nebraska NAMS/SLAMS Siting Criteria Review Sheet for Sulfur Dioxide

Pre-Siting Review for proposed SO_2 site at NPPD's Sheldon Station

Agency: Nebraska Department of Environmental Quality :

Location: Approximately 935 feet north of W Pella Road on the west side of SW 42 Street in Lancaster County at NPPD's Sheldon Station

City & State: Rural area north of Hallam, NE

AIRS Site ID: Proposed site - To be assigned (31-109-nnnn)

Date: May 11, 2016

Reviewer: Jim Yeggy

Monitoring Objective: Source-oriented		Scale: Micro-scale
40 CFR Part 58 Appendix E Criteria	**Requirements**	**Review Comments**
Section 2: Horizontal & vertical probe placement	2 to 15 m above ground	Analyzer will be housed within an enclosed trailer or dedicated enclosure structure. Inlet will be constructed to comply with inlet placement criteria. Anticipated inlet height ~3 m.
	At least 1 m from supporting structure	
	If on side of building, should be on side of prevailing winter wind	Not applicable.
Section 3: Spacing from minor sources	No furnace or other minor SO_2 sources nearby	OK
Section 4: Spacing from obstructions	Distance from obstacle to probe at least 2x the obstacle height above the probe	OK
	Exceptions for street canyon or building mounted inlets	Not applicable
Section 5: Spacing from trees	At least 10 m from tree drip-line	OK. The closest trees are ~ 80 M form proposed site.
	Microscale sites: no trees between source and probe	OK. The source is the 176 ft high stacks. The trees between the stacks and proposed site are ~ 30 ft tall. Also the modeling inputs included these trees.
Section 6: Spacing from Roadways	Not applicable to SO_2	Not applicable
General Comments: None		

Nebraska 2016 Ambient Air Monitoring Network Plan
Attachment E: NPPD Sheldon Station DRR Monitoring Site Proposal
Amended August 2016

Sulfur Dioxide 1-Hour NAAQS Designations Modeling Protocol
Nebraska Public Power District, Sheldon Station (Facility ID #33563)
Hallam, NE
July 15, 2015

INTRODUCTION

This modeling protocol addresses proposed dispersion modeling for the Nebraska Public Power District (NPPD) Sheldon Station, in Lancaster County, near Hallam, Nebraska. The protocol summarizes the information that will be used to conduct dispersion modeling with respect to the National Ambient Air Quality Standard (NAAQS) for 1-hour average sulfur dioxide (SO_2) concentration, which is equal to 75 parts per billion (ppb) or approximately 196.5 micrograms per cubic meter ($\mu g/m^3$)

This protocol has been prepared for 1-hour SO_2 State Implementation Plan (SIP) dispersion modeling and is being submitted to the Nebraska Department of Environmental Quality (NDEQ) for review and approval. The results of the dispersion modeling analysis will be used by the NDEQ to formulate recommendations to EPA on the NAAQS attainment/nonattainment area designations for SIP purposes. EPA will review and use this information, along with any available monitoring data, to propose and finalize attainment/nonattainment designations for affected areas with respect to the 1- hour SO_2 NAAQS.

MODELING SOFTWARE

The following EPA modeling software will be used for this analysis.

- AERMOD (Version 15181)
- BPIP-Prime (Version 04274)
- AERMAP (Version 11103)

The AERMOD model will be executed using the rural dispersion mode, given the predominantly rural character of the land surrounding the subject facility.

METEOROLOGICAL DATA

Meteorological data for this analysis will be provided by NDEQ in preprocessed format, based on the most recent versions of AERMET (Version 14134), AERMINUTE (Version 14337), and AERSURFACE (Version 13016).

The surface meteorological will be from Lincoln, Nebraska and the upper air data will be from Omaha, Nebraska, which are considered representative of the Hallam area. This analysis will use three years of meteorological data for the years 2012 through 2014.

POLLUTANT AND AVERAGING PERIOD

The AERMOD model will be executed for SO_2 for 1-hour averages. By selecting SO_2 as the pollutant and 1-hour as the averaging period, AERMOD will automatically average the results over the three years of meteorology. The model result for comparison with the 1-hour SO_2 NAAQS of 196.5 $\mu g/m^3$ (75 parts per billion) will be the maximum of the 3-year average of the 4^{th} highest (99^{th} percentile) daily 1-hour maximum concentration, as automatically output by AERMOD from the multiyear (3-year) model run.

POINT SOURCES

Emission points to be modeled for Sheldon Station will include only the Unit 1 and 2 coal boiler stacks. The NDEQ and EPA have reviewed the other emissions sources in the region and determined that there are no nearby sources with large enough emissions to be included in a modeling analysis together with Sheldon Station. Thus, total impact for comparison with the NAAQS will consist of Unit 1 for Scenario 1, and Unit 1 and Unit 2 combined for Scenario 2, plus the background concentration (see below). The AERMOD output will be set up to produce source contributions for each unit, plus the total ("ALL" source group) concentrations.

The actual, hourly SO_2 emissions measured by the continuous emissions monitoring system (CEMS) on the Unit 1and 2 stacks will be used for this analysis, by using the optional hourly emissions input file for input to AERMOD. The single hourly emissions file will correspond with the same period of record represented by the three year period of meteorological data (2012-2014) input to AERMOD.

In addition to hourly SO_2 emissions in grams/second, the hourly emissions file will include hourly average stack gas exhaust temperature and exhaust gas exit velocity. These additional hourly parameters will be based on measurements recorded by the same CEMS systems being used to track hourly SO_2 emissions for each stack, in accordance with the routine monitoring requirements under 40 CFR 60 (New Source Performance Standards) and 40 CFR 75 (Continuous Emission Monitoring under the Acid Rain program).

In addition to the stack heights and the hourly emissions and stack parameters described above, the only other stack parameters needed by AERMOD are the stack exit diameters. The stack diameters to be input for Units 1 and 2 will be identical at 11.6 feet (3.536 m), based on the current design of these stacks.

BUILDING DOWNWASH INPUTS

The AERMOD input will include building downwash parameters calculated using the EPA's Building Profile Input Program "PRIME" (BPIPPRIME) software (Version 04274). The BPIPPRIME input and output (I/O) files will be provided along with all the other modeling I/O files on CD with the final modeling report.

TERRAIN ELEVATIONS

Terrain data will be processed to determine receptor elevations and "hill heights" for input to AERMOD using AERMAP, Version 11103. The AERMAP input will include terrain elevation data from the National Elevation Dataset (NED). The NED data available on-line in 1 arc-second spacing from the US Geological Survey will be used for this analysis. The receptor grid (extent defined below) will include receptors only in UTM Zone 14. The NED data for this analysis will be based on North American Datum (NAD) 83 for horizontal locations and NAD88 for vertical locations (elevations).

The NED terrain file downloaded from the USGS will be provided on CD along with all other model I/O files.

RECEPTOR GRID

Given there will be no nearby facilities included in this analysis, the receptor grid can be focused on just Sheldon Station. The receptor grid will include the following spacing on the fence lines and at downwind distances from the nearest fence lines.

- 50 meter spacing on the fence line
- 50 meter spacing from the fence to 1 kilometer from the fence
- 100 meter spacing from 1 kilometer to 2 kilometers from the fence
- 250 meter spacing from 2 kilometer to 5 kilometers from the fence
- 500 meter spacing from 5 kilometer to 7 kilometers from the fence
- 1000 meter spacing from 7 to 10 kilometers from the fence

The extent of this receptor grid is shown in the figure at the end of this protocol, and based on prior modeling experience, is expected to encompass areas of maximum 1-hour SO_2 concentration.

Any hot spots in the 250 meter and coarser receptor spacing will be refined by performing a separate model run centered on the hot spot, with a 1000-meter by 1000-meter grid of 50-meter spacing centered on the highest impact receptor from the initial model run.

BACKGROUND CONCENTRATION

The background 1-hour SO_2 concentration will be based on data from the rural monitor located at Cedar Bluff Reservoir (EPA Site ID number 201950001) in Trego County in western Kansas. This monitor is far from any nearby large SO_2 sources, so is representative of background concentrations in rural areas of Nebraska exclusive of nearby major source impacts.

Given that there are apparent monitor operational problems evidenced in the data for the most recent year of complete data, 2014, the background concentration will be based on the next most recent three years of available data, those being 2011-2013. The table below shows the calculated average of the
99^{th} percentile daily maximum 1-hour value as 8.7 $\mu g/m^3$ across the three years. Therefore, a background 1-hour SO_2 concentration of 9 $\mu g/m^3$ will be used for this analysis.

	Daily Maximum 1-hour,	
Year	**(ppm)**	**($\mu g/m^3$)**
2011	3	7.9
2012	4	10.5
2013	3	7.9
Average	**3.3**	**8.7**

MODELING REPORT

A final modeling report will be submitted to NDEQ for review, describing modeling procedures (attaching this protocol), mitigation features (design changes), if any, proposed by the utility, and including all model and preprocessor input and output files on CD/DVD, with the exception of the meteorological data preprocessing files given that the NDEQ performed the meteorological data preprocessing. The data on CD/DVD will include all the hourly emissions (CEM) data files used to input actual emissions to AERMOD.

The modeling report will contain graphics displaying, at a minimum,

- source locations,
- receptor locations,
- meteorological data locations,
- background monitor location,
- contour plots displaying modeled design values (for general receptor grid and any refined grid model runs), and
- a bar chart showing background plus source impact for comparison with the NAAQS.

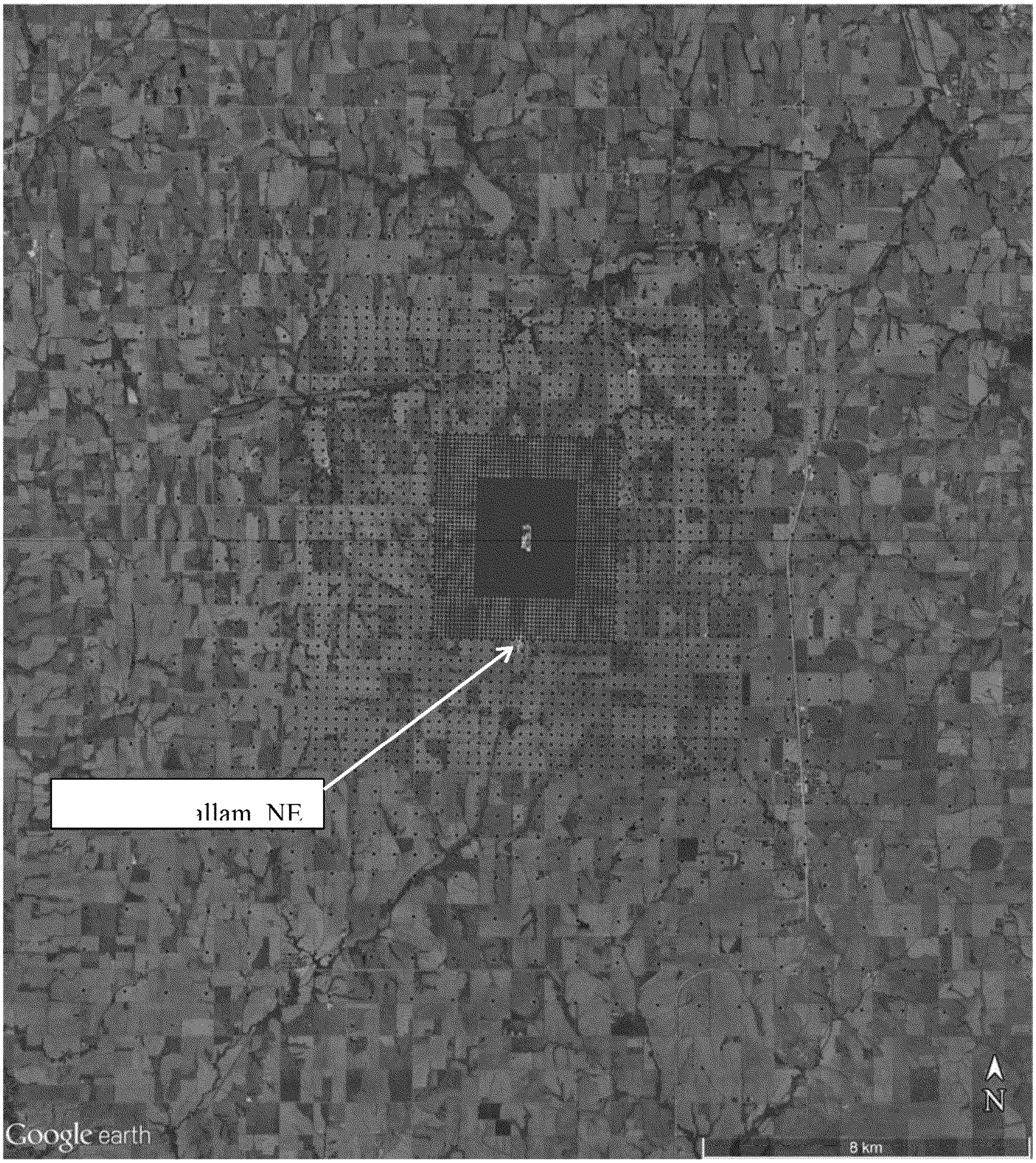
A copy of the final modeling files used to support the analysis will be provided on CD/DVD

to: Lisa Alam
c/o Records Management
Nebraska Department of Environmental Quality
1200 "N" Street, Suite 400
P.O. Box 98922
Lincoln, Nebraska 68509-8922

The data and graphics files included on the CD/DVD will include as a minimum:

- AERMOD input and output files (source and receptor input data file, hourly emissions file, output listing file, and output graphics/plot file)
- Contour plot and bar chart graphics file(s)
- Source location graphic file (*.kml) from Google Earth
- Source, met data and background monitor location map/graphic
- AERMAP terrain data processor input file
- Preprocessed meteorological data (*.sfc and *.pfl) files provided by NDEQ
- BPIP-PRIME preprocessor input and output files

Nebraska 2016 Ambient Air Monitoring Network Plan
Attachment E: NPPD Sheldon Station DRR Monitoring Site Proposal
Amended August 2016



To: Wiese, Carrie[carrie.wiese@nebraska.gov]; Avey, Lance[Avey.Lance@epa.gov]
Cc: Wharton, Tracy[tracy.wharton@nebraska.gov]
From: Peter, David
Sent: Tue 8/30/2016 5:57:46 PM
Subject: RE: Sheldon Station Monitor Siting Report

That would be fine.

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Tuesday, August 30, 2016 12:49 PM
To: Avey, Lance <Avey.Lance@epa.gov>; Peter, David <peter.david@epa.gov>
Cc: Wharton, Tracy <tracy.wharton@nebraska.gov>
Subject: RE: Sheldon Station Monitor Siting Report

Good afternoon, David;

I'm following up on this message from last week as to how to submit the revised attachment. Should it be submitted to whom the original monitoring plan was submitted, with you copied? (the monitoring plan is submitted by a different section than mine.)

Thanks,
Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Friday, August 26, 2016 8:49 AM
To: Wiese, Carrie; Peter, David
Cc: Wharton, Tracy
Subject: RE: Sheldon Station Monitor Siting Report

Hi Carrie,

I am really not sure the best way to submit the revised attachment for Sheldon other than through mail or attached in email. Modeling files can be sent to me via a burned CD. I included David Peter on this email, he may have thoughts on best way to submit the updated documentation.

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Thursday, August 25, 2016 3:53 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Cc: Wharton, Tracy <tracy.wharton@nebraska.gov>
Subject: RE: Sheldon Station Monitor Siting Report

Hi Lance,

I think we're ready to submit the revised attachment for Sheldon as well as the modeling files. How should this be submitted? We will also need the administrative record for the network plan to reflect the updated attachment.

Thanks,

Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Monday, August 15, 2016 11:12 AM
To: Wiese, Carrie
Cc: Wharton, Tracy
Subject: RE: Sheldon Station Monitor Siting Report

Hi Carrie,

Thanks for passing this along. From the technical perspective, this looks good and satisfies the criteria in the Monitoring TAD. Would you be able to pass on the modeling files when NDEQ receives them?

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Friday, August 12, 2016 2:24 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Cc: Wharton, Tracy <tracy.wharton@nebraska.gov>
Subject: FW: Sheldon Station Monitor Siting Report

Hi Lance,

Attached, please find a draft report from NPPD concerning the monitor siting for Sheldon Station. Does this satisfy the further needs we discussed on the site justification?

Thanks,

Carrie

From: Vanek, Jason A. [mailto:javanek@nppd.com]
Sent: Friday, July 29, 2016 11:00 AM
To: Wiese, Carrie; Wharton, Tracy; Schneider, Shelley
Cc: Holmes,, Scott- Lincoln Lancaster County Health Department; Schroeder,, Chris- City of Lincoln; Citta Jr., Joseph L.
Subject: Sheldon Station Monitor Siting Report

Attached is the Sheldon Station SO2 monitor siting report showing the preferred location of the SO2 monitor. I attempted to email the modeling files but due to the size of the attachment the email was rejected by your systems. I will mail a hard copy of the report along with a CD of the modeling files to the NDEQ. If you have any questions please let me know.

Thank you

Jason Vanek, P.E.

Environmental Engineer

Nebraska Public Power District

E-Mail: javanek@nppd.com

Office: (402) 563-5333

Cell: (402) 910-1717

Fax: (402) 563-5168

To: Avey, Lance[Avey.Lance@epa.gov]; Peter, David[peter.david@epa.gov]
Cc: Wharton, Tracy[tracy.wharton@nebraska.gov]
From: Wiese, Carrie
Sent: Tue 8/30/2016 5:49:10 PM
Subject: RE: Sheldon Station Monitor Siting Report

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I'm following up on this message from last week as to how to submit the revised attachment. Should it be submitted to whom the original monitoring plan was submitted, with you copied? (the monitoring plan is submitted by a different section than mine.)

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Sent: Friday, July 29, 2016 11:00 AM
To: Wiese, Carrie; Wharton, Tracy; Schneider, Shelley
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Jason Vanek, P.E.

Environmental Engineer

Nebraska Public Power District

E-Mail: javanek@nppd.com

Office: (402) 563-5333

Cell: (402) 910-1717

Fax: (402) 563-5168

To: Avey, Lance[Avey.Lance@epa.gov]
Cc: Wharton, Tracy[tracy.wharton@nebraska.gov]
From: Wiese, Carrie
Sent: Thur 8/25/2016 8:53:02 PM
Subject: RE: Sheldon Station Monitor Siting Report

Hi Lance,

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Environmental Engineer

Nebraska Public Power District

E-Mail: javanek@nppd.com

Office: (402) 563-5333

Cell: (402) 910-1717

Fax: (402) 563-5168

To: Avey, Lance[Avey.Lance@epa.gov]
From: Ashton, Brad [DNR]
Sent: Thur 8/18/2016 8:32:35 PM
Subject: Louisa DRR Modeling
removed.txt
SO2_DRR_ALL.AMI
SO2_DRR_ALL.AML
Memo_Louisa SO2 DRR.DOCX

Lance,

I have attached the updated DRR modeling for Louisa per our discussion. As you are aware, there are seven operating scenarios for MPW in the Muscatine NAA analysis, so we included all of those in this analysis as well. The attached summary includes the results for all of them, but I only attached the modeling files for the ALL scenario. If you need the other scenarios as well let me know and I can send them to you in separate emails.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

IOWA DEPARTMENT OF NATURAL RESOURCES

Environmental Services Division
Air Quality Bureau
Modeling Group

M E M O R A N D U M

DATE: 09-MAY-2016

TO: MIDAM LOUISA FILE

FROM: DON PETERSON

RE: LOUISA GENERATING STATION DATA REQUIREMENTS RULE SO2 MODELING

CC:

PROJECT SUMMARY

The SO2 DRR modeling submitted by MidAmerican for the Louisa Generating Station was revised to make the receptor array equivalent to that used in the Muscatine SO2 NAA model. In addition, the SO2 sources for GPC, MPW, and Monsanto were added to the submitted model.

A dominant source, boiler #8 (MON195) at Monsanto, was modified to use the actual SO2 emission rate. Otherwise, all other source parameters for GPC, MPW, and Monsanto remain identical to the current NAA model.

The DRR models represent the 7 different operating scenarios for the 3 MPW boilers 70 (U7), 80 (U8), and 90 (U9). The Louisa model is for determining the impact of Louisa on GPC, MPW, and Monsanto.

The 1-hr SO2 modeling results, including the default 7 ug/m3 background, are as follows:

<table>
<tr><th>Scenario</th><th>ug/m3
(NAAQS = 196)</th><th>X</th><th>Y</th></tr>
<tr><td>ALL</td><td>191</td><td rowspan="7">662219</td><td rowspan="7">4585008</td></tr>
<tr><td>U7OFF</td><td>191</td></tr>
<tr><td>U7ONLY</td><td>194</td></tr>
<tr><td>U8OFF</td><td>194</td></tr>
<tr><td>U8ONLY</td><td>191</td></tr>
<tr><td>U9OFF</td><td>191</td></tr>
<tr><td>U9ONLY</td><td>194</td></tr>
<tr><td>LOUISA</td><td>77</td><td>659565</td><td>4579221</td></tr>
</table>

For the 7 MPW boiler scenarios the design concentration occurs along the eastern boundary of GPC. For the Louisa scenario, the design concentration occurs near the western end of Monsanto's property.

************************* ATTACHMENT REMOVED *************************

This message contained an attachment which the administrator has caused to be removed.

************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

```
** BUILDING CRN  659624.50  4575658.50
** BUILDING CRN  659634.00  4575658.50
** BUILDING CRN  659634.00  4575652.60
** BUILDING CRN  659644.90  4575652.60
** BUILDING CRN  659644.90  4575679.80
** BUILDING CRN  659624.10  4575679.80
** BUILDING BLD  42  1  177.16  47.24  4
** BUILDING IDN  BLD7
** BUILDING CRN  659580.20  4575786.60
** BUILDING CRN  659580.20  4575797.10
** BUILDING CRN  659645.60  4575797.00
** BUILDING CRN  659645.60  4575786.60

** TERRFILE  C:\ZZ_AQB~1\1PROGD~1\0ELEVA~1\NEDFIL~1\LOUISA.TIF  2  0  WGS84  15  0
624655.6  4539336.9  623721.4  4594106.3  683851.8  4595387.6  685240.4  4540615.2
** TERRFILE  C:\ZZ_AQB~1\1PROGD~1\0ELEVA~1\NEDFIL~1\MUSCATINE.TIF  2  0  WGS84  15  0
635097.9  4567378.0  634311.4  4609597.8  691098.0  4610884.2  692217.4  4568662.3
** AMPTYPE  NED
** AMPDATUM  2
** AMPZONE  15
** AMPHEMISPHERE  N

** PROJECTION  UTM
** DATUM  WGE
** UNITS  METER
** ZONE  2
** HEMISPHERE  N
** ORIGINLON  0
** ORIGINLAT  0
** PARALLEL1  0
** PARALLEL2  0
** AZIMUTH  0
** SCALEFACT  0
** FALSEEAST  0
** FALSENORTH  0

** POSTFMT  UNFORM
** TEMPLATE USERDEFINED
** AERMODEXE  AERMOD_EPA_15181.EXE
** AERMAPEXE  AERMAP_EPA_11103.EXE
```

To: Avey, Lance[Avey.Lance@epa.gov]
Cc: Wharton, Tracy[tracy.wharton@nebraska.gov]
From: Wiese, Carrie
Sent: Tue 8/16/2016 1:50:06 PM
Subject: RE: Sheldon Station Monitor Siting Report

Hi Lance,

Yes, we have the modeling files and should be able to get copies made and sent via snail mail. I also don't recall if we talked about the logistics of submitting everything; do we need to submit the full network plan again with these updates, or just submit the revised appendices and modeling files?

Thanks

Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Monday, August 15, 2016 11:12 AM
To: Wiese, Carrie
Cc: Wharton, Tracy
Subject: RE: Sheldon Station Monitor Siting Report

Hi Carrie,

Thanks for passing this along. From the technical perspective, this looks good and satisfies the criteria in the Monitoring TAD. Would you be able to pass on the modeling files when NDEQ receives them?

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

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avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Friday, August 12, 2016 2:24 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Cc: Wharton, Tracy <tracy.wharton@nebraska.gov>
Subject: FW: Sheldon Station Monitor Siting Report

Hi Lance,

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Thanks,

Carrie

From: Vanek, Jason A. [mailto:javanek@nppd.com]
Sent: Friday, July 29, 2016 11:00 AM
To: Wiese, Carrie; Wharton, Tracy; Schneider, Shelley
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Thank you

Jason Vanek, P.E.

Environmental Engineer

Nebraska Public Power District

E-Mail: javanek@nppd.com

Office: (402) 563-5333

Cell: (402) 910-1717

Fax: (402) 563-5168

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Fri 8/12/2016 6:48:05 PM
Subject: FYI: -RE: OPPD hourly data
WalterScott_ModelingProtocol_121115.pdf

Lance:

OPPD No Omaha provided us with hourly emission rates, in lb/hr, not normalized

I might try to set up OPPD and Walter Scott to run over the weekend, if I have time

I will

- correct the Whitman monitor location, and label it in the description
- run OPPD using an hourly emission rate file for UNIT4 and UNIT5
- run Walter Scott (WSEC) emissions as point sources using the emission rate, temperature, and velocity from Table 1 and Table 2 in their Dec 2015 protocol

Since there's no easy way to define WSEC's fence line, I will neglect that for the time being

I attached WSEC's protocol for convenience

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Friday, August 12, 2016 11:40 AM
To: Alam, Lisa
Subject: RE: OPPD hourly data

Hi Lisa,

Thanks for passing this along. I think for IDNR, where they are modeling for the DRR, using potentials at Walter Scott and actuals at OPPD is ok under the DRR and for this "separate area analysis". But yes, I will have to confirm.

For OPPD, which is going down the monitor route and the siting is based on normalized CEMs, it would be ideal to use normalized CEMs from Walter Scott too for that analysis. If we can't get normalized CEMs for Walter Scott, I have some ideas to use the Whitmore SO2 and Eppley airport data to see if the "areas are separate". And then maybe you would not need to worry about putting Walter Scott into your modeling.

I am out of the office this afternoon (actually driving up to Nebraska to visit family), but will give you a call Monday to discuss.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Friday, August 12, 2016 10:49 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: FW: OPPD hourly data

Lance:

This just arrived.

I didn't know NDEQ, IDNR and OPPD North Omaha were communicating on this matter.

We now have emission data for the same time frame, but Walter Scott emissions are derived from their maximum

potential SO2 emissions and a 30 - day rolling permit limit that was used to develop hourly emission rates per the

approach outlined in the EPA Guidance for 1 - Hour SO2 modeling TAD. OPPD North Omaha emissions are

from CEMS data. Doesn't this mean we're modeling potential and actual together? Isn't this an apples to oranges

comparison? Does it matter? Walter Scott's emissions should be more conservative, but how will static velocity

and temperature values factor in, or does that matter?

I’m outside of my experience and comfort zone trying to make a call on this.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

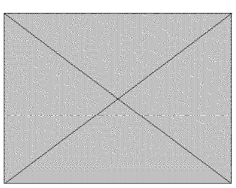
(402) 471-2925

From: HOLMES, ALLAN R [mailto:arholmes@oppd.com]
Sent: Friday, August 12, 2016 10:05 AM
To: matthew.johnson@dnr.iowa.gov
Cc: BAKER, RUSSELL J; Wiese, Carrie; Alam, Lisa
Subject: OPPD hourly data

Matthew,

As we discussed, attached are two Excel spreadsheets with hourly data for Omaha Public Power District (OPPD) North Omaha Station Units 4 and 5. Both spreadsheets include two tabs, one tab has 2013-2015 data and the other tab has 2012 data. Please let me know if you need additional information. Thanks.

Bob



Bob Holmes

Environmental Affairs Administrator

Omaha Public Power District

444 South 16th Street Mall, Omaha NE 68102

(402) 636-2505

arholmes@oppd.com

TECHNICAL MEMORANDUM

MidAmerican Walter Scott Jr. Energy Center SO_2 Modeling Protocol

PREPARED FOR: MidAmerican Energy Company

PREPARED BY: CH2M HILL

DATE: November 23, 2015

MidAmerican Energy Company retained CH2M to conduct air dispersion modeling to aid in the attainment designation for the 2010 sulfur dioxide (SO_2) 1-hour National Ambient Air Quality Standard (NAAQS) in the area around its Walter Scott Jr. Energy Center. This modeling protocol is being prepared for the Iowa Department of Natural Resources (IDNR) for review and comment on the dispersion modeling approach proposed to demonstrate attainment with the standard.

The methods and approach to the dispersion modeling analysis are consistent with the Environmental Protection Agency (EPA) Guideline on Air Quality Models[1], IDNR Modeling Guidance[2], and the 1-hr SO_2 Modeling Technical Assistance Document[3].

Dispersion Model

The EPA recommended AERMOD modeling system is proposed for the analysis. The AERMOD model (Version 15181) will be used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD are also proposed:

- BPIP-Prime (Version 04274)
- AERMET (Pre-processed by IDNR, Version 15181)
- AERMAP (Pre-processed by IDNR)

If there is version change to AERMOD prior to submitting the modeling analysis to IDNR, the most recent version of AERMOD will be utilized.

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD will be run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from IDNR and preprocessed by AERMAP

[1] U.S. Environmental Protection Agency (EPA). 2005. *Appendix W of 40 CFR Part 51—Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, November.

[2] IDNR, 2014. *Air Dispersion Modeling Guidelines – For Non-PSD, Pre-construction Permit Applications.* Environmental Services Division. Air Quality Bureau. Version 12-19-2014.

[3] EPA. 2013a. *Draft SO_2 NAAQS Designations Modeling Technical Assistance Document.* Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division. December

- SO_2 pollutant keyword

Receptor Grid

Receptors were supplied by IDNR and are sited outside of the fence line boundary of the Walter Scott Jr. Energy Center. Receptor placement grid spacing is:

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 5 km

Consistent with Section 4.2 of EPA's December 2013 draft *SO_2 NAAQS Designations Modeling Technical Assistance Document,* receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Missouri River. Figure 1 shows the receptor grid for the modeling analysis.

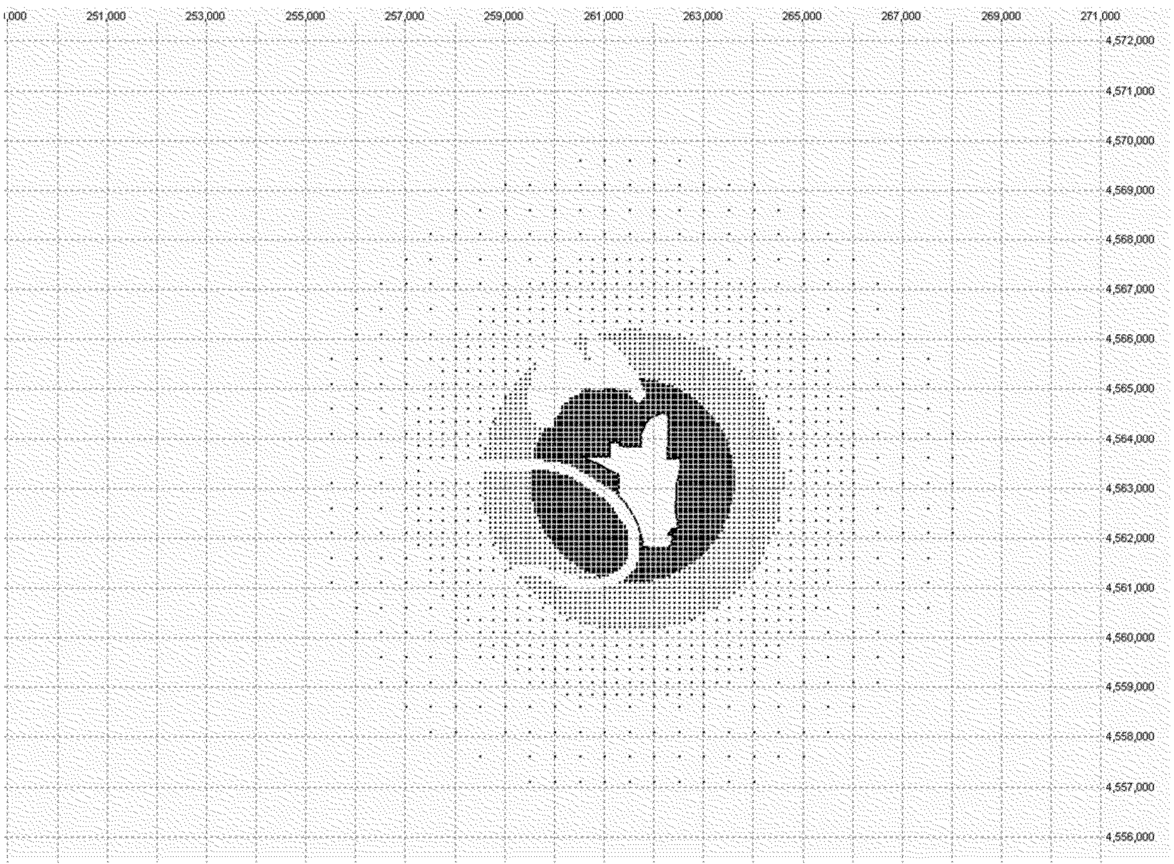


Figure 1. Modeling Receptor Grid

Meteorological Data

Hourly meteorological data for the dispersion modeling analysis were obtained from IDNR. These data were pre-processed with the AERMET program by IDNR. The data were collected from the Omaha, NE (KOMA) station for calendar years 2012 through 2014 and are considered representative of the

ED_001261_00009699

conditions near the Walter Scott, Jr. Energy Center. Figure 2 shows the 3-year wind rose for the KOMA station.

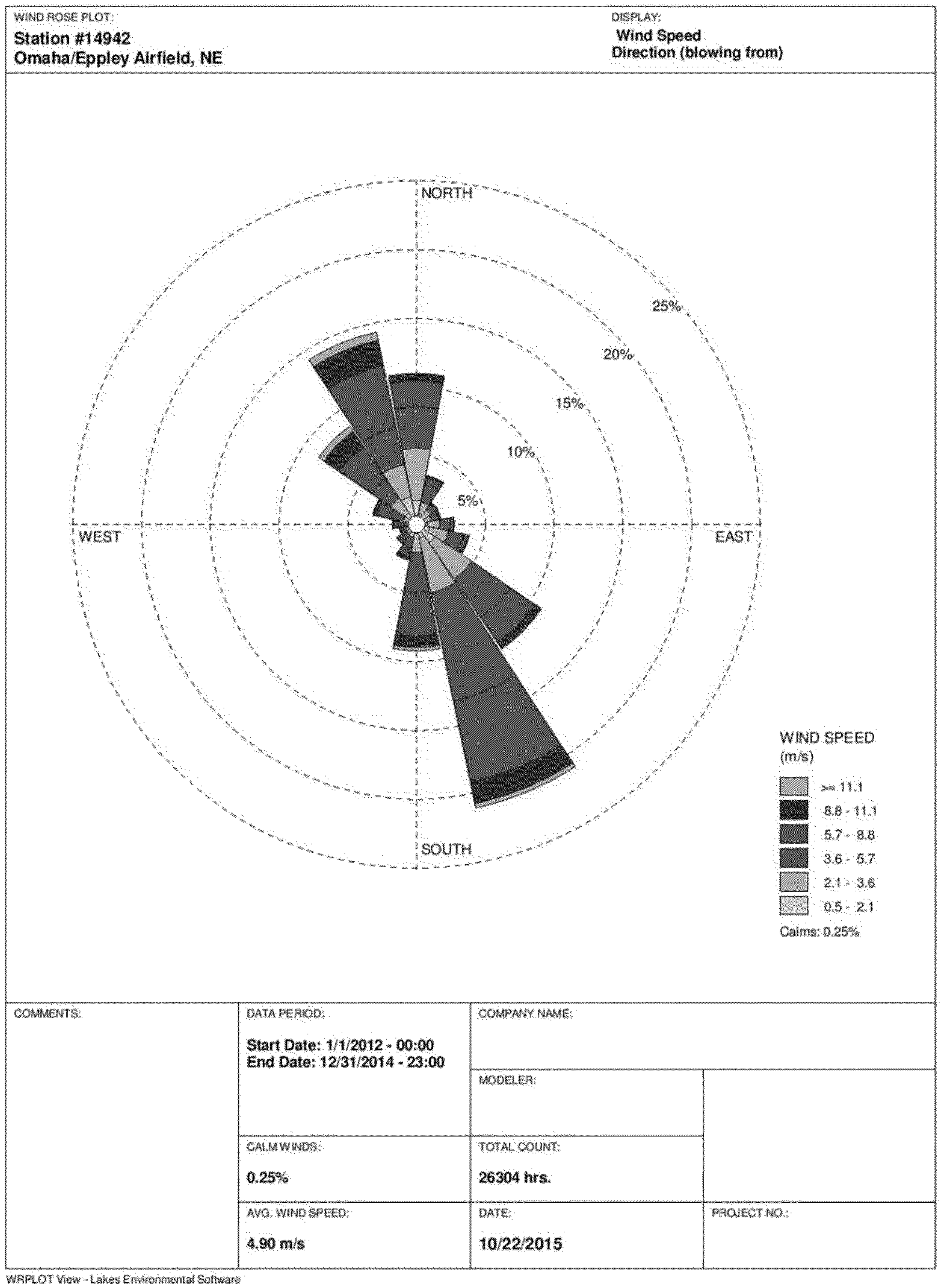


Figure 2. KOMA 3-year Wind Rose (2012-2014)

Background Concentration

IDNR Modeling guidance[4] recommends a statewide 1-hour SO_2 background concentration of 7 micrograms per cubic meter ($\mu g/m^3$). This conservative concentration will be added to the model design value for comparison to the 1-hour SO_2 NAAQS.

Model Design Value

The model design value will be used in conjunction with representative background concentrations for comparison to the NAAQS. For SO_2, consistent with EPA guidance[5], the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hour modeled concentration will be added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hour concentration at each receptor using the SO_2 pollutant keyword[6].

Nearby Sources of SO_2

IDNR requested the nearby OPPD North Omaha Station be included in the 1-hour SO_2 modeling demonstration. No other sources of SO_2 were requested to be included in the modeling analysis and regional or small sources of SO_2 would be considered to be included in the background concentration.

Source Characterization and Emission Rates

Both the MidAmerican Walter Scott, Jr. Energy Center and OPPD North Omaha Station include a number of emission units that emit SO_2. All emission units modeled in AERMOD will be characterized as point sources. Table 1 summarizes the emission units and stack characteristics to be used in the 1-hour SO_2 modeling demonstration. Small sources of SO_2, such as emergency generators and comfort heating, will not be included in the analysis as concentrations from these small sources of SO_2 would be considered as part of the background.

Table 1. Walter Scott, Jr. Energy Center and Omaha Public Power District Point Source Exhaust Characteristics

Model ID	Unit Description	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
EP003	WS Unit 3	261,898.22	4,562,476.92	294.72	167.64	7.62	355.37	28.977
EP141	WS Unit 4	262,145.9	4,562,589.8	294.70	167.945	7.5286	347.04	24.917
EP142	WS Unit 4 Aux. Boiler	262,017.0	4,562,476.0	294.50	88.392	1.753	427.59	20.537
OPPDA	Units 1-3	253,446.59	4,579,479.15	303.581	62.1792	4.42	422	36.58
OPPDB	Unit 4	253,421.41	4,579,505.24	303.581	62.1792	2.93	422	36.88
OPPDC	Unit 5	253,401.92	4,579,524.45	303.581	62.1792	3.51	422	36.58

4 http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/BackgroundData.aspx. Accessed December 2015.

5 EPA. 2013a. *Draft SO_2 NAAQS Designations Modeling Technical Assistance Document.* Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division. December

6 EPA. 2015. *Addendum: Users Guide for the AMS/EPA Regulatory Model – AERMOD.* Office of Air Quality Planning and Standards. Research Triangle Park, NC. June.

Table 1. Walter Scott, Jr. Energy Center and Omaha Public Power District Point Source Exhaust Characteristics

Model ID	Unit Description	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)

Notes:
WS: Walter Scott, Jr. Energy Center
OPPD: Omaha Public Power District North Omaha Station
m: meters
K: degrees Kelvin
m/s: meters per second
Aux: auxiliary

The emission units at Walter Scott Jr. Energy Center will be modeled at their maximum potential SO_2 hourly emission rates.

The Unit 4 Auxiliary Boiler is considered a natural gas unit. Its modeled emission rate reflect potential SO_2 emissions while utilizing natural gas as a fuel.

For Walter Scott Unit 3 and Unit 4, the current 30-day rolling permit limits were used to develop an hourly emission rate per the approach outlined in the EPA G*uidance for 1-Hour SO_2 Nonattainment Area [State Implementation Plan] Submissions* memorandum released on April 23, 2014.

Based on this guidance, the following approach is proposed to develop a 1-hour emission rate for the attainment demonstration modeling of the two units.

1. Review existing continuous emission monitoring data for each unit to develop a ratio of 30-day rolling averages to hourly emissions The ratio would be developed as 99th percentile of the five year data from 2010 to 2014.
2. Use the ratio to develop hourly emission rate using the current 30-day rolling permit limit.
3. Utilize the 1-hour emission rate to demonstrate compliance with the standard with modeling.

The three step approach above resulted in a ratio of 0.8174 for Unit 3 and 0.8436 for Unit 4. The current 30-day rolling average emission limits of 0.4 lbs/mmBtu for Unit 3 and 0.1 lbs/mmBtu for Unit 4 were then converted to pound per hour rates. The ratios calculated above were then applied to these pound per hour emission rates as listed in Table 2 below, and used in the modeling analysis.

Emission rates for the OPPD North Omaha Station were supplied by IDNR[7] and reflect maximum measured 1-hour average emission rates reported on the USEPA, Clean Air Markets.

Table 2 summarizes the emissions to be used in the analysis.

Table 2. Modeled SO_2 Emission Rate

Model ID	Unit Description	SO_2 Emission Rate (lb/hr)
EP003	Walter Scott, Jr. Energy Center Unit 3	3,768.0
EP141	Walter Scott, Jr. Energy Center Unit 4	909.79
EP142	Walter Scott, Jr. Energy Center Unit 4 Aux. Boiler	0.21

[7] Email from Jennifer Krzak/IDNR to Joshua Mohr/MidAmerican. Subject: *OPPD Potential Rates.* October 6, 2015.

Table 2. Modeled SO_2 Emission Rate

Model ID	Unit Description	SO_2 Emission Rate (lb/hr)
OPPDA	OPPD North Omaha Station Units 1-3	1,409.9
OPPDB	OPPD North Omaha Station Unit 4	651.6
OPPDC	OPPD North Omaha Station Unit 5	994.2

Note:
OPPD: Omaha Public Power District
lb/hr: pounds per hour
Emission rates reflect maximum CEM data

OPPD Emission Rate Consideration

As described above, the OPPD Omaha North Station emission rates are based on maximum hourly emissions from 2012 through 2014. These emissions will be used in the analysis to demonstrate attainment with the standard and represent a conservative estimate for the attainment analysis. OPPD plans on retiring Units 1-3 (Stack OPPDA) by April 2016 to coincide with the expiration of their extension for compliance under the Mercury and Air Toxics Standard (MATS). If the OPPD emissions increase significantly in the future compared to what is being modeled, a revised modeling analysis may be required to demonstrate attainment with the 1-hour SO2 NAAQS. IDNR will track the emissions from the OPPD Omaha North Station and notify MidAmerican Energy Company if additional modeling would be warranted.

Presentation of Results

The results of the air dispersion modeling analyses will be presented as follows:

- A description of modeling methodologies and input data
- A summary of the results in tabular and, where appropriate, graphical and narrative form
- Modeling files used for AERMOD will be provided on a CD-ROM
- Any significant deviations from the methodology proposed in this protocol will be presented

To: lisa.alam@nebraska.gov[lisa.alam@nebraska.gov]
Cc: Avey, Lance[Avey.Lance@epa.gov]; Wiese, Carrie[carrie.wiese@nebraska.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Zayudis, Peter [DNR][Peter.Zayudis@dnr.iowa.gov]
From: Ashton, Brad [DNR]
Sent: Mon 8/8/2016 8:22:12 PM
Subject: RE: WSEC Data
removed.txt

Lisa,

We are not aware of an accurate method to back-calculate temperature and velocity from the heat input and gross load values in the spreadsheet we provided to you.

We requested the 2012-2015 data from MidAmerican late last week (including hourly temperature and flow data). We have not heard back from the yet, but we will let you know when they respond.

- Brad

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, August 08, 2016 10:20 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Cc: Avey, Lance <Avey.Lance@epa.gov>; Wiese, Carrie <carrie.wiese@nebraska.gov>
Subject: RE: WSEC Data

Brad:

Thank you for providing Walter Scott emissions data. The dataset includes SO2 emission (lb/hr), heat input (MMBtu), and gross load (MW) for Unit 3.

Question: How is stack gas exit temperature and velocity calculated from heat input and gross load for coal fired boilers?

OPPD North Omaha provided the Department with CEMs data that included

2013-15 hourly data, for both Units 4 and 5,

normalized actual emissions (g/s), and

velocity (m/s) and temperature (K).

It would be a more defensible analysis to use an apples to apples comparison in our effort to demonstrate OPPD and Walter Scott are in different areas whose impacts do not significantly overlap.

I'm certain we can find a solution to this difficulty and come up with the

same data years,

for all emission units with either actual normalized emissions or maximum potential normalized emissions, should be the same

including variable temperature, and velocities,

from both facilities to complete this analysis.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]

Sent: Friday, August 05, 2016 10:34 AM
To: Alam, Lisa
Cc: Zayudis, Peter [DNR]; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: RE: WSEC Data

Lisa,

After I sent this email to you we realized that the data may not be entirely useful to you because it only includes the CEMs data for Unit 3. MidAmerican used this data to represent the variability of both units 3 and 4, so we do not currently have CEM data for Unit 4.

We will contact MidAmerican and ask for the additional data that you need and request 2015 as well when we do so.

- Brad

From: Ashton, Brad [DNR]
Sent: Friday, August 05, 2016 10:26 AM
To: 'Alam, Lisa' <lisa.alam@nebraska.gov>
Cc: Zayudis, Peter [DNR] <Peter.Zayudis@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: WSEC Data

Lisa,

I have attached the data that we already have for Walter Scott. It is for 2012-2014 only, and only includes the hourly emission rates. This is all I can provide to you in the short term.

After you talk to Carrie about the additional data you will be obtaining from OPPD let me know if you will still need the 2015 data for WSEC.

- Brad

BRAD ASHTON, **Lead Worker – Dispersion Modeling**

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

Leading Iowans in Caring for Our Natural Resources.

To: brad.ashton@dnr.iowa.gov[brad.ashton@dnr.iowa.gov]
Cc: Avey, Lance[Avey.Lance@epa.gov]; Wiese, Carrie[carrie.wiese@nebraska.gov]
From: Alam, Lisa
Sent: Mon 8/8/2016 3:20:21 PM
Subject: RE: WSEC Data
removed.txt

Brad:

Thank you for providing Walter Scott emissions data. The dataset includes SO2 emission (lb/hr), heat input (MMBtu), and gross load (MW) for Unit 3.

Question: How is stack gas exit temperature and velocity calculated from heat input and gross load for coal fired boilers?

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from both facilities to complete this analysis.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Friday, August 05, 2016 10:34 AM
To: Alam, Lisa
Cc: Zayudis, Peter [DNR]; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
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We will contact MidAmerican and ask for the additional data that you need and request 2015 as well when we do so.

- Brad

From: Ashton, Brad [DNR]
Sent: Friday, August 05, 2016 10:26 AM
To: 'Alam, Lisa' <lisa.alam@nebraska.gov>

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Mon 8/8/2016 2:14:29 PM
Subject: FYI: FW: WSEC Data
removed.txt
WSEC 2012-2014 SO2 CEM Data.xlsx

Lance:

Attached is the emissions for Walter Scott that Brad Ashton from IDNR sent me on Friday

It's for Unit 3 only, 2012-14

Email: Brad.Ashton@dnr.iowa.gov

Phone: (515) 725-9527

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Friday, August 05, 2016 10:26 AM
To: Alam, Lisa
Cc: Zayudis, Peter [DNR]; McGraw, Jim [DNR]; Johnson, Matthew [DNR]
Subject: WSEC Data

Lisa,

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After you talk to Carrie about the additional data you will be obtaining from OPPD let me know if you will still need the 2015 data for WSEC.

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling

Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

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************************* ATTACHMENT REMOVED *************************

This message contained an attachment which the administrator has caused to be removed.

************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

To: Citta Jr., Joseph L.[jlcitta@nppd.com]; Vanek, Jason A.[javanek@nppd.com]
Cc: Avey, Lance[Avey.Lance@epa.gov]; Peter, David[peter.david@epa.gov]; Schneider, Shelley[shelley.schneider@nebraska.gov]; Wharton, Tracy[tracy.wharton@nebraska.gov]
From: Wiese, Carrie
Sent: Thur 7/14/2016 1:49:31 PM
Subject: FW: Monitoring/modeling TAD

Good morning, Joe and Jason:

Thanks for taking the time to meet with us yesterday afternoon to discuss the status of EPA's review of our SO2 DRR submittal on July 1. I am forwarding, below, a link to the monitoring technical assistance document (TAD), which is guidance EPA published on how to select monitoring sites for DRR-affected sources.

As I understand it, the piece of analysis that is missing from our discussion of the site selection for Sheldon Station is described beginning at the bottom of page A-6 of the TAD, through page A-10. An example is provided in the document from Georgia in the second link, beginning in Appendix E on page 132, through page 138. If memory serves from our phone calls with Ed Liebsch, he had already conducted the frequency/ranking analysis for the receptors modeled around Sheldon, and we talked through the siting concerns on the phone and during our visit to Sheldon. This should, then, mainly be a concern of documenting the process.

As I mentioned during our meeting yesterday, I'll be out on vacation starting tomorrow through July 25, but I would suggest that we set a conference call with Ed once he's had the opportunity to look this over, and discuss our next steps for preparing the documentation of analysis. Tracy Wharton in our office can serve to coordinate the call in my absence, so please feel free to reach out to her directly rather than delay discussion until I have returned. I understand you are all anxious to begin site preparation for the monitor at Sheldon, and that rests in part on completing these requirements.

I have copied Lance Avey and David Peter at EPA Region 7, should you or Ed have questions about how to complete the analysis.

Thanks!

Carrie

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, July 12, 2016 3:44 PM
To: Wiese, Carrie
Cc: Schneider, Shelley; Algoe-Eakin, Amy; Crable, Gregory
Subject: RE: Monitoring/modeling TAD

Hi Carrie,

Here is a link to latest Draft SO2 Monitoring TAD (it is always subject to change and thus not final):

https://www.epa.gov/sites/production/files/2016-04/documents/so2monitoringtad.pdf

Appendix A provides the recommended example of a modeling demonstration to inform monitoring placement for 1-hr SO2. You can see the "ranking" analysis I described on the call within this Appendix.

Also, here is a link to the State of Georgia's air monitoring plan where they performed this ranking analysis to site a monitor for a DRR source (see pages 111-139):

http://amp.georgiaair.org/docs/2016%20Ambient%20Air%20Monitoring%20Plan.pdf

Please let me know of any further questions.

Thanks
Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Wiese, Carrie [mailto:carrie.wiese@nebraska.gov]
Sent: Tuesday, July 12, 2016 3:29 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Cc: Schneider, Shelley <shelley.schneider@nebraska.gov>
Subject: Monitoring/modeling TAD

Hi Lance,

I was wondering if you could send a final copy of the monitoring TAD/appendix referencing modeling that you discussed in our call this afternoon? We have had a hard time finding anything online, and the document we did locate is labeled "draft".

Thanks!
Carrie

Carrie Wiese

Carrie Wiese

Supervisor – Air Quality Grants, Planning and Outreach Unit

Nebraska Department of Environmental Quality

1200 N Street, Suite 400

Lincoln, NE 68508

(402)471-6624, carrie.wiese@nebraska.gov

To: Bybee, Darcy (darcy.bybee@dnr.mo.gov)[darcy.bybee@dnr.mo.gov]; Wilbur, Emily[emily.wilbur@dnr.mo.gov]
Cc: Peter, David[peter.david@epa.gov]; Hawkins, Andy[hawkins.andy@epa.gov]; Brown, Steven[Brown.Steven@epa.gov]; Avey, Lance[Avey.Lance@epa.gov]
From: Algoe-Eakin, Amy
Sent: Wed 7/13/2016 8:09:24 PM
Subject: FYI- Region 7 Comments on MDNR DRR modeling protocol

Emily and Darcy,

Thank you for providing the protocol for DRR modeling. Overall, Andy has reviewed and believes the document looks good.

We consider the comments below informal, as we believe the DRR modeling protocol is a living document. It is our desire to be reasonable and work with you to address issues which may invariably arise and the modeling protocol may need to be adjusted.

For specifics related to the comments below, please feel free to directly discuss with Andy.

1. Section 3.3 if the department is aware of fixed release parameters different than in MoEIS they should be evaluated for use. For example, RATA data contains stack parameters at varying loads. There may be other stack testing data the department has that can be used. MDNR should attempt to avoid using stack parameters not reflecting normal actual operations that may lead to under predicted modeling concentrations. Modeling with stack parameters under varying load scenarios may be appropriate if stack temp and exit velocity parameters are fixed while emissions vary. This is especially true if the modeled design value is close to the NAAQS or if there is wide range of stack exit conditions that can't be represented by a fixed parameter.

2. Section 3.4 A hot spot analysis may be necessary if high modeled results occur in areas with large receptor spacing distance. This might occur for those sources with tall stacks whose maximum impacts may extend downwind and in areas of terrain or next to other smaller sources of SO_2 emissions where there is an interaction.

3. Section 3.6 please consider specifying if monthly or seasonal assignments will be used in AERSURFACE.

4. Section 4.1 – please work with EPA should the background methodology vary substantially over past MDNR analysis. We agree that each area should be evaluated independently and discussed in the final report.

5. Pg 18 contains this statement…All monitors being sited to comply with the DRR must be operational no later than January 1, 2017. Should any new monitors not be operational by that date, the source will move to the modeling pathway to characterize air quality and the analysis will follow this protocol for modeled sources. – There is uncertainty about this statement and we might want to talk about this further to understand context.

Amy Algoe-Eakin, Section Chief

U.S. EPA Region 7

Air & Waste Management Division

Air Planning and Development Branch

(913) 551-7942 (Office)

(913) 424-8853 (Cell)

11201 Renner Boulevard, Lenexa KS 66219
algoe-eakin.amy@epa.gov

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Wed 7/13/2016 7:00:01 PM
Subject: Oh My Dog! plot file is in ASCII format

Oh yes, of course, R programing code. Why didn't I think of that? :□/

And OAQPS is right, Kansas City is boring, but then so was Atlanta, GA.

Actually, any city is boring if you're stuck in a boring part of town.

When you, if you, can retrieve an excel file, could you share that with me? Will you then drop that into AIRPLOT?

OMG – the plot file is in ASCII format, and shouldn't that be the path to sorting this out? I mean, it's sorted by receptor, and lists the H1H … to

* AERMOD (15181): OPPD North Omaha 07/12/16

* AERMET (15181): SO2 Monitor Placement NDVs, MAXDAILY
13:40:18

* MODELING OPTIONS USED: RegDFAULT CONC ELEV RURAL

* PLOT FILE OF 1ST-HIGHEST MAX DAILY 1-HR VALUES AVERAGED OVER 3 YEARS FOR SOURCE GROUP: ALL

* FOR A TOTAL OF 271 RECEPTORS.

* FORMAT: (3(1X,F13.5),3(1X,F8.2),2X,A6,2X,A8,2X,A5,5X,A8,2X,10(F13.5,2X,I8.8,2X:))

* X Y AVERAGE CONC ZELEV ZHILL ZFLAG AVE GRP RANK NET ID AVER CONC YR1 DATE YR1 AVER CONC YR2 DATE YR2 AVER CONC YR3 DATE YR3

* _____________ _____________ _____________ _______ _______ _______ _______
_________ _________ _________ _______________ _________ _______________ _________
_______________ _________

247161.10000 4584015.00000 2.17095 402.17 402.17 0.00 1-HR ALL
1ST 1.87993 13120203 1.98256 14010905 2.65037 15121905

248661.10000 4579765.00000 2.01954 392.84 392.84 0.00 1-HR ALL
1ST 1.76150 13082221 1.68602 14060421 2.61109 15081002

250911.10000 4578265.00000 1.89057 375.19 375.19 0.00 1-HR ALL
1ST 1.11044 13032904 2.11514 14103120 2.44612 15070721

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Wednesday, July 13, 2016 12:14 PM
To: Alam, Lisa
Subject: RE: Modeling for Siting Examples

Yep, I am going to try and crank through the MAXDAILY file using R programming code and output the results into Excel.

On the RSL meeting, I will ask about Abode Connect. It seems like that would an easy option and one OAQPS may be thinking of. We have mentioned hosting RSL type meetings in Kansas City, but we always get the feel that OAQPS feels the Kansas City area is too boring.

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Wednesday, July 13, 2016 11:51 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Modeling for Siting Examples

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Hi Lisa,

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I will let you know how it goes.

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So, what am I doing wrong?

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did this work?

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Subject: RE: Modeling for Siting Examples

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1	xth highest daily	and so on ……..		
in 2013				

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From: Alam, Lisa
Sent: Wed 7/13/2016 1:44:18 PM
Subject: RE: Modeling for Siting Examples
OPPD SO2Monito_3.ami
MAXDAILY outpu.wat

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```
** BREEZE AERMOD
** Trinity Consultants
** VERSION  7.10

CO STARTING
CO TITLEONE  OPPD North Omaha
CO TITLETWO  SO2 Monitor Placement NDVs, MAXDAILY with 200 receptors
CO MODELOPT  DFAULT  CONC
CO RUNORNOT  RUN
CO AVERTIME  1
CO POLLUTID  SO2
CO FINISHED

SO STARTING
SO ELEVUNIT  METERS
SO LOCATION  NO4      POINT    253421.41162109  4579505.2360825  301.59
** SRCDESCR  Unit No 4
SO LOCATION  NO5      POINT    253401.92  4579524.45  301.59
** SRCDESCR  Unit No 5
SO SRCPARAM  NO4      1  62.1792  410.93  36.576  2.92
SO SRCPARAM  NO5      1  62.1792  399.82  36.576  3.5052
SO BUILDHGT  NO4        42.82     42.82     42.82     42.82     42.82     32.92
SO BUILDHGT  NO4        32.92     32.92     32.92     29.26     29.26     29.26
SO BUILDHGT  NO4        29.26     26.44     26.44     26.44     26.44     42.82
SO BUILDHGT  NO4        42.82     42.82     42.82     42.82     42.82     32.92
SO BUILDHGT  NO4        32.92     32.92     32.92     26.44     26.44     26.44
SO BUILDHGT  NO4        26.44     26.44     26.44     26.44     26.44     42.82
SO BUILDWID  NO4        58.25     58.16     56.30     52.73     53.54    134.71
SO BUILDWID  NO4       133.53    128.29    119.16     41.86     40.54     37.99
SO BUILDWID  NO4        34.29     30.46     52.10     72.16     90.02     56.57
SO BUILDWID  NO4        58.25     58.16     56.30     52.73     53.54    134.71
SO BUILDWID  NO4       133.53    128.29    119.16     90.51     72.47     52.24
SO BUILDWID  NO4        30.41     30.46     52.10     72.16     90.02     56.57
SO BUILDLEN  NO4        51.86     46.49     39.70     31.72     33.94     75.53
SO BUILDLEN  NO4        93.77    109.15    121.22     40.27     39.66     37.85
SO BUILDLEN  NO4        34.88    131.67    131.00    126.35    117.86     55.65
SO BUILDLEN  NO4        51.86     46.49     39.70     31.72     33.94     75.53
SO BUILDLEN  NO4        93.77    109.15    121.22    117.08    125.46    130.02
SO BUILDLEN  NO4       130.64    131.67    131.00    126.35    117.86     55.65
SO XBADJ     NO4        73.74     79.05     81.95     82.36     74.23     60.99
SO XBADJ     NO4        45.89     29.39     12.01   -124.54   -128.01   -127.60
SO XBADJ     NO4      -123.31    -59.95    -64.06    -66.23    -66.38   -121.84
SO XBADJ     NO4      -125.60   -125.53   -121.65   -114.08   -108.18   -136.52
SO XBADJ     NO4      -139.66   -138.55   -133.23    -78.77    -79.87    -78.54
SO XBADJ     NO4       -74.83    -71.72    -66.94    -60.12    -51.47     66.19
SO YBADJ     NO4       -23.38     -5.76     12.04     29.47     45.82     26.08
SO YBADJ     NO4        43.17     58.95     72.93     31.34     12.72     -6.29
SO YBADJ     NO4       -25.11     25.27     25.79     25.53     24.49     40.29
SO YBADJ     NO4        23.38      5.76    -12.04    -29.47    -45.82    -26.08
SO YBADJ     NO4       -43.17    -58.95    -72.93    -15.45    -18.80    -21.58
SO YBADJ     NO4       -23.70    -25.27    -25.79    -25.53    -24.49    -40.29
SO BUILDHGT  NO5        42.82     42.82     42.82     42.82     42.82     42.82
SO BUILDHGT  NO5        42.82     32.92     32.92     32.92     29.26     29.26
SO BUILDHGT  NO5        29.26     26.44     26.44     26.44     26.44     26.44
SO BUILDHGT  NO5        42.82     42.82     42.82     42.82     42.82     42.82
SO BUILDHGT  NO5        42.82     32.92     32.92     32.92     26.44     26.44
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SO BUILDHGT  NO5        26.44    26.44    26.44    26.44    26.44    26.44
SO BUILDWID  NO5        58.25    58.16    56.30    52.73    53.54    56.68
SO BUILDWID  NO5        58.10   128.29   119.16   106.41    40.54    37.99
SO BUILDWID  NO5        34.29    30.46    52.10    72.16    90.02   105.15
SO BUILDWID  NO5        58.25    58.16    56.30    52.73    53.54    56.68
SO BUILDWID  NO5        58.10   128.29   119.16   106.41    72.47    52.24
SO BUILDWID  NO5        30.41    30.46    52.10    72.16    90.02   105.15
SO BUILDLEN  NO5        51.86    46.49    39.70    31.72    33.94    41.69
SO BUILDLEN  NO5        48.16   109.15   121.22   129.60    39.66    37.85
SO BUILDLEN  NO5        34.88   131.67   131.00   126.35   117.86   105.79
SO BUILDLEN  NO5        51.86    46.49    39.70    31.72    33.94    41.69
SO BUILDLEN  NO5        48.16   109.15   121.22   129.60   125.46   130.02
SO BUILDLEN  NO5       130.64   131.67   131.00   126.35   117.86   105.79
SO XBADJ     NO5        58.20    67.66    75.06    80.17    76.81    68.26
SO XBADJ     NO5        57.63    45.25    31.50    16.79  -103.13  -101.11
SO XBADJ     NO5       -96.03   -32.70   -37.67   -41.51   -44.08   -45.31
SO XBADJ     NO5      -110.06  -114.14  -114.76  -111.89  -110.76  -109.95
SO XBADJ     NO5      -105.79  -154.41  -152.72  -146.39  -104.76  -105.03
SO XBADJ     NO5      -102.11   -98.97   -93.32   -84.84   -73.78   -60.48
SO YBADJ     NO5       -45.91   -30.65   -14.45     2.19    18.58    34.66
SO YBADJ     NO5        49.69    36.64    53.72    69.17     1.33   -13.19
SO YBADJ     NO5       -27.30    27.86    33.07    37.27    40.35    42.20
SO YBADJ     NO5        45.91    30.65    14.45    -2.19   -18.58   -34.66
SO YBADJ     NO5       -49.69   -36.64   -53.72   -69.17    -7.41   -14.69
SO YBADJ     NO5       -21.51   -27.86   -33.07   -37.27   -40.35   -42.20
SO HOUREMIS
C:\Users\LISA~1.ALA\DOCUME~1\OPPDNO~1\MAXDAILY\HOUREMIS131415OPPD.HRL   NO4  NO5
** HOUREMIS
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SO SRCGROUP  ALL
SO FINISHED

RE STARTING
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RE DISCCART  247161.1  4584015  402.17  402.17
RE DISCCART  248661.1  4579765  392.84  392.84
RE DISCCART  250911.1  4578265  375.19  375.19
RE DISCCART  247161.1  4583765  400.55  400.55
RE DISCCART  250661.1  4578265  368.92  368.92
RE DISCCART  247161.1  4584265  402.51  402.51
RE DISCCART  248411.1  4579765  388.25  388.25
RE DISCCART  249411.1  4578765  378.52  378.52
RE DISCCART  263911.1  4579515  408.37  408.37
RE DISCCART  248661.1  4579265  387.51  387.51
RE DISCCART  248911.1  4579765  382.98  387.12
RE DISCCART  262911.1  4579765  411.05  411.05
RE DISCCART  251161.1  4579015  356.64  361.05
RE DISCCART  247161.1  4584515  401.02  401.02
RE DISCCART  247411.1  4584015  397.32  399.59
RE DISCCART  264411.1  4579515  407.67  407.67
RE DISCCART  247161.1  4583515  399.6  399.6
RE DISCCART  249161.1  4578515  385.96  385.96
RE DISCCART  248661.1  4579515  388.56  388.56
RE DISCCART  250411.1  4579765  370.49  370.49
RE DISCCART  249911.1  4579515  377.3  377.3
RE DISCCART  250161.1  4579765  368.88  368.88
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RE	DISCCART	246911.1	4584515	399.26	399.26
RE	DISCCART	262911.1	4578515	410.19	410.19
RE	DISCCART	251911.1	4578015	361.59	361.59
RE	DISCCART	249661.1	4579265	376.34	376.34
RE	DISCCART	249161.1	4577515	379.13	379.13
RE	DISCCART	263161.1	4577765	401.47	401.47
RE	DISCCART	247411.1	4583515	396.82	396.82
RE	DISCCART	247411.1	4583765	393.14	399.54
RE	DISCCART	247911.1	4585015	400.09	400.09
RE	DISCCART	246411.1	4584265	397.4	397.4
RE	DISCCART	246911.1	4583265	396.55	396.55
RE	DISCCART	248411.1	4579265	383.9	383.9
RE	DISCCART	248911.1	4578265	381.89	381.89
RE	DISCCART	246411.1	4584515	395.29	395.29
RE	DISCCART	250411.1	4580015	371.79	371.79
RE	DISCCART	247161.1	4583015	396.29	396.29
RE	DISCCART	249411.1	4577265	383.24	383.24
RE	DISCCART	249661.1	4577765	369.43	369.43
RE	DISCCART	246411.1	4586015	400.44	400.44
RE	DISCCART	250661.1	4579515	364.95	364.95
RE	DISCCART	246161.1	4585765	400.42	400.42
RE	DISCCART	251911.1	4581515	323.34	354.63
RE	DISCCART	262911.1	4578765	412.17	412.17
RE	DISCCART	263411.1	4579765	402.79	402.79
RE	DISCCART	252161.1	4581015	310.55	348.9
RE	DISCCART	252161.1	4581265	312.25	312.25
RE	DISCCART	250161.1	4579515	370.38	373.04
RE	DISCCART	249161.1	4578765	372.84	385.53
RE	DISCCART	249911.1	4578015	375.08	375.08
RE	DISCCART	251911.1	4577765	358.62	362.21
RE	DISCCART	251911.1	4581265	316.45	352.52
RE	DISCCART	249661.1	4579015	379.42	379.42
RE	DISCCART	253411.1	4577515	318.99	318.99
RE	DISCCART	251661.1	4581765	352.98	357.51
RE	DISCCART	252661.1	4577515	315.87	315.87
RE	DISCCART	249411.1	4578515	374.25	374.25
RE	DISCCART	253411.1	4577265	318.12	318.12
RE	DISCCART	248411.1	4584765	395.51	395.51
RE	DISCCART	255661.1	4579765	299.01	299.01
RE	DISCCART	253411.1	4577765	317.11	317.11
RE	DISCCART	252911.1	4578015	310.39	310.39
RE	DISCCART	255411.1	4579765	298.93	298.93
RE	DISCCART	245411.1	4588765	403.43	403.43
RE	DISCCART	253161.1	4577265	317.12	317.12
RE	DISCCART	248161.1	4579765	378.3	378.3
RE	DISCCART	253161.1	4577015	318.18	318.18
RE	DISCCART	255911.1	4579765	298.51	298.51
RE	DISCCART	247911.1	4582765	393.06	393.06
RE	DISCCART	248911.1	4580515	383.7	383.7
RE	DISCCART	252411.1	4580765	316.14	316.14
RE	DISCCART	252661.1	4577265	317.4	317.4
RE	DISCCART	251661.1	4581515	341.43	353.88
RE	DISCCART	253161.1	4577515	318.3	318.3
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RE	DISCCART	252661.1	4577765	313.23	313.23

RE	DISCCART	253161.1	4576765	318.67	318.67
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RE	DISCCART	247411.1	4584515	396.99	396.99
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RE	DISCCART	256161.1	4579765	298.95	298.95
RE	DISCCART	255161.1	4579765	298.89	298.89
RE	DISCCART	245911.1	4585515	398.12	398.12
RE	DISCCART	262661.1	4579265	403.48	409.47
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RE	DISCCART	249161.1	4579515	375.91	375.91
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RE	DISCCART	250161.1	4578015	361.04	370.04
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RE	DISCCART	253411.1	4576765	317.55	317.55
RE	DISCCART	252411.1	4577015	320.99	320.99
RE	DISCCART	262911.1	4577765	397.67	401.65
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RE	DISCCART	246161.1	4589015	401.92	401.92
RE	DISCCART	253161.1	4576515	319.21	319.21
RE	DISCCART	245161.1	4589015	402.29	402.29
RE	DISCCART	263161.1	4579765	399	406.95
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RE	DISCCART	252411.1	4581015	308.69	314.63
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RE	DISCCART	244911.1	4590015	403.29	403.29
RE	DISCCART	255911.1	4580015	299.11	299.11
RE	DISCCART	254161.1	4579515	300.27	300.27
RE	DISCCART	248661.1	4578015	383.41	383.41
RE	DISCCART	253161.1	4577765	317.13	317.13
RE	DISCCART	248661.1	4580015	384.14	387.13
RE	DISCCART	256161.1	4580015	298.62	298.62
RE	DISCCART	251411.1	4578015	363.15	363.15
RE	DISCCART	251661.1	4582015	354.84	372.27
RE	DISCCART	251911.1	4581765	336.89	366.2
RE	DISCCART	248661.1	4584765	395.64	395.64
RE	DISCCART	249161.1	4577265	382.93	384.98
RE	DISCCART	256411.1	4579765	298.89	298.89
RE	DISCCART	252661.1	4577015	317.74	317.74
RE	DISCCART	262411.1	4578765	406.44	408.77
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RE	DISCCART	250911.1	4578515	367.2	370.05
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RE	DISCCART	256411.1	4580015	298.69	298.69
RE	DISCCART	253411.1	4576515	317.78	317.78
RE	DISCCART	255661.1	4580015	298.64	298.64
RE	DISCCART	255161.1	4579015	299.13	299.13
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RE	DISCCART	248911.1	4578765	375.07	375.07
RE	DISCCART	253161.1	4576265	317.79	317.79

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RE	DISCCART	251661.1	4578015	358.71	358.71
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RE	DISCCART	251161.1	4582265	358.21	373.01
RE	DISCCART	255661.1	4578765	298.54	298.54
RE	DISCCART	255411.1	4578765	298.98	298.98
RE	DISCCART	254911.1	4579015	299.04	299.04
RE	DISCCART	262661.1	4578765	406.29	406.29
RE	DISCCART	263161.1	4579265	402.89	402.89
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RE	DISCCART	249411.1	4577765	371.74	381.31
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RE	DISCCART	251161.1	4578765	361.37	361.37
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RE	DISCCART	245911.1	4589515	401.17	401.17
RE	DISCCART	245161.1	4589515	401.18	401.18
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RE	DISCCART	251161.1	4586765	395.48	395.48
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RE DISCCART  253068.3  4580087.8  302.37  316.37
RE FINISHED

ME STARTING
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15_KOMA_OMX_AERMINUTE.SFC"
** SURFFILE  "C:\Users\LISA~1.ALA\DOCUME~1\OPPDNO~1\TAD\MODEL\2013-
15_KOMA_OMX_AERMINUTE.SFC"
ME PROFFILE  "C:\Users\LISA~1.ALA\DOCUME~1\OPPDNO~1\TAD\MODEL\2013-
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** PROFFILE  "C:\Users\LISA~1.ALA\DOCUME~1\OPPDNO~1\TAD\MODEL\2013-
15_KOMA_OMX_AERMINUTE.PFL"
ME SURFDATA  14942 2013
ME UAIRDATA  94980 2013
ME PROFBASE  299  METERS
ME STARTEND  2013  1  1  1  2015  12  31  24
ME FINISHED

OU STARTING
OU RECTABLE  1  FIRST
OU FILEFORM  FIX
OU SUMMFILE  SUMMARYFILE.SUM
OU PLOTFILE  1  ALL  FIRST  ALL`1`FIRST.plt  10000
OU MAXDAILY  ALL ALL.mxd 10001
OU FINISHED

** ****************************************************************************
** It is recommended that the user not edit any data below this line
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** TAG PRM  0  1  F  F  1  255,0,255,0
** TAG CRD            254056.3,4575976.9,0.0
** TAG NAM  MONITOR
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** AMPTYPE  NED
** AMPDATUM  2
** AMPZONE  15
** AMPHEMISPHERE  N

** PROJECTION  UTM
** DATUM  WGE
** UNITS  METER
** ZONE  15
** HEMISPHERE  N
** ORIGINLON  0
** ORIGINLAT  0
** PARALLEL1  0
** PARALLEL2  0
** AZIMUTH  0
** SCALEFACT  0
** FALSEEAST  0
** FALSENORTH  0

** POSTFMT  UNFORM
** TEMPLATE Regulatory,0
** AERMODEXE  AERMOD_EPA_15181.exe
** AERMAPEXE  AERMAP_EPA_11103.EXE
```

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Mon 7/11/2016 5:30:14 PM
Subject: RE: Modeling for Siting Examples
OPPD NO Omaha normalized CEMS monitor placement.wat

did this work?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Monday, July 11, 2016 12:21 PM
To: Alam, Lisa
Subject: RE: Modeling for Siting Examples

Hi Lisa,

Thank you for putting this together. Our system flags and removes attachment ending in ".zip". Can you rename it to ".piz" or something different than ".zip" and resend.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, July 11, 2016 10:01 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: Modeling for Siting Examples

Lance:

Attached is the SO2 monitor placement model using TAD Monitoring Guidance document as recommended.

I ran the model for the 1-hour, 24-hour, and annual averaging periods, using

CEMs normalized emissions,

concurrent 2013-15 Omaha-Omaha met data

USGS NED terrain (not attached)

20 km grid - spaced 250 meters from the facility to 10 km and 500 meters from 10 km to 20 km

I deleted onsite receptors, however, receptors over the Missouri River, wetlands and sand barges along river, Carter Lake, Eppley and No. Omaha airfields were included in the model. I left these in because I don't believe I have enough control/accuracy to zero in on the appropriate receptors using Trinity Breeze's GUI. Trinity's approach is to do a "print screen" of Google Earth, and pull the image file into AERMOD. I can give it a try, but the placement could be off as much as 100 to 200 meters using their approach, the approximate width of the Missouri River. If you have a better approach, please let me know – and send me a copy of the edited AERMOD input file.

If you have any questions feel free to call. I didn't include the NED file due to its size, but I can easily send it upon request.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, June 30, 2016 3:56 PM
To: Alam, Lisa
Subject: Modeling for Siting Examples

Hi Lisa,

It would be recommended to go through the modeling siting demonstration for North Omaha similar to the one in the SO2 Monitoring TAD (Appendix A):

https://www3.epa.gov/airquality/sulfurdioxide/pdfs/SO2MonitoringTAD.pdf

and like the State of Georgia did (see pages 111-139) for a SO2 DRR source:

http://amp.georgiaair.org/docs/2016%20Ambient%20Air%20Monitoring%20Plan.pdf

Of course, it would best to use varying emissions (normalized), exit velocities (if available), and stack temperature (if available) over a 3-yr period. This along with the historical information on the Whitmore site you provided should make for a good analysis.

I am writing because I will be out of the office tomorrow and all of next week. I have done this modeling process before, and did not take too long. So I am willing to help. If you have questions, I will be able to answer via email next week.

Thanks

Lance

Lance Avey

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1	-95.951106	41.334550
2	-95.951591	41.334391
3	-95.949745	41.328248
4	-95.949473	41.328248
5	-95.949170	41.327361
6	-95.946475	41.325449
7	-95.946202	41.325427
8	-95.945412	41.324562
9	-95.942077	41.326222
10	-95.942198	41.328248
11	-95.941319	41.328520

Sulfur Dioxide 1-Hour NAAQS – Data Requirement Rule, Dispersion Modeling Protocol
Public Power Generation Agency/Hastings Utilities, Whelan Energy Center
(Facility ID #33563)
Hastings, Nebraska
June 21, 2016

INTRODUCTION

This modeling protocol addresses proposed dispersion modeling for the Public Power Generation Agency (PPGA)/Hastings Utilities, Whelan Energy Center (WEC), in Adams County, near Hastings, Nebraska. The protocol summarizes the information that will be used to conduct dispersion modeling with respect to the National Ambient Air Quality Standard (NAAQS) for 1-hour average sulfur dioxide (SO_2) concentration, which is equal to 75 parts per billion (ppb) or approximately 196.5 micrograms per cubic meter ($\mu g/m^3$)

This protocol has been prepared to satisfy the dispersion modeling option in the Data Requirements Rule (DRR – see 40 CFR 51, Subpart BB) for implementing the 1-hour SO_2 NAAQS, and is being submitted to the Nebraska Department of Environmental Quality (NDEQ) for review and approval. The results of the dispersion modeling analysis will be used by the NDEQ to formulate recommendations to EPA on the NAAQS attainment/nonattainment area designations for State Implementation Plan (SIP) purposes. EPA will review and use this information, along with any available monitoring data, to propose and finalize attainment/nonattainment designations for affected areas with respect to the 1-hour SO_2 NAAQS.

MODELING SOFTWARE

The following EPA modeling software will be used for this analysis.

- AERMOD (Version 15181)
- BPIP-Prime (Version 04274)
- AERMAP (Version 11103)

The AERMOD model will be executed using the rural dispersion mode, given the predominantly rural character of the land surrounding the subject facility.

METEOROLOGICAL DATA

Meteorological data for this analysis were provided by NDEQ in preprocessed format, based on the most recent versions of AERMET (Version 15181), AERMINUTE (Version 15272), and AERSURFACE (Version 13016).

The surface meteorological data to be used are from Grand Island, Nebraska and the upper air data are from Omaha, Nebraska, which are considered representative of the Hastings area. This analysis will use three years of meteorological data for the years 2013 through 2015.

POLLUTANT AND AVERAGING PERIOD

The AERMOD model will be executed for SO_2 for 1-hour averages. By selecting SO_2 as the pollutant and 1-hour as the averaging period, AERMOD will automatically average the results over the three years of meteorology. The model result for comparison with the 1-hour SO_2 NAAQS of

196.5 μg/m^3 (75 parts per billion) will be the maximum of the 3-year average of the 4th highest (99th percentile) daily 1-hour maximum concentration, as automatically output by AERMOD from the multiyear (3-year) model run.

POINT SOURCES

Emission points to be modeled for the WEC analysis will include the Unit 1 and 2 coal boiler stacks at the site, plus several nearby facility SO_2 sources. The nearby facilities that will be included are:

- Platte Generating Station (PGS) - coal-fired power plant near Grand Island
- Ag Processing (AGP) – corn and soybean processing plant with coal boiler near Hastings
- Chief Ethanol – ethanol (from corn) production facility with coal boiler

The locations of these facilities in relation to WEC are shown in Figure 1.

Emission rates of SO_2 for the WEC boilers will be based on actual, hourly emission data for the 2012-2014 period. The actual, hourly SO_2 emissions measured by the continuous emissions monitoring system (CEMS) on the Unit 1 and 2 stacks will be used for this analysis, by using the optional hourly emissions input file for input to AERMOD. The single hourly emissions file will correspond with the same period of record represented by the three year period of meteorological data (2012-2014) input to AERMOD.

In addition to hourly SO_2 emissions in grams/second, the hourly emissions file will include hourly average stack gas exhaust temperature and exhaust gas exit velocity. These additional hourly parameters will be based on measurements recorded by the same CEMS systems being used to track hourly SO_2 emissions for each stack, in accordance with the routine monitoring requirements under 40 CFR 60 (New Source Performance Standards) and 40 CFR 75 (Continuous Emission Monitoring under the Acid Rain program).

All the nearby sources will be modeled based on their potential-to-emit (PTE) emission rates, in accordance with current permitted allowable emission rates.

The AERMOD model output will be set up to produce source contributions for WEC and for each nearby facility, to assist in diagnosing any impacts that might be caused wholly or mostly by one of the nearby facilities. In addition, a source group will be used to provide the total ("ALL" source group) concentrations.

BUILDING DOWNWASH INPUTS

The AERMOD input will include building downwash parameters calculated using the EPA's Building Profile Input Program "PRIME" (BPIPPRIME) software (Version 04274). The BPIPPRIME input and output (I/O) files will be provided along with all the other modeling I/O files on CD with the final modeling report.

Downwash structures for WEC will be input to the BPIP-Prime preprocessor and the AERMOD model, based on data used in prior approved modeling analyses for WEC. A review of the building dimensions and exhaust stack heights for the other nearby facilities indicate that only the AGP facility has a structure that might create downwash of plumes leading to significant impacts.

The PGS boiler stack is at least equal to the good engineering practice (GEP) height needed to avoid plume downwash. The coal boiler stack at the Chief site is tall enough to avoid downwash, based structure heights and locations on the site. The AGP boiler stack is significantly less than GEP height with respect to the adjacent boiler building, which is the dominant structure at the site. Therefore, the AGP boiler building will be input to the BPIP-Prime downwash analysis and AERMOD to account for potential downwash effects.

TERRAIN ELEVATIONS

Terrain data will be processed to determine receptor elevations and "hill heights" for input to AERMOD using AERMAP, Version 11103. The AERMAP input will include terrain elevation data from the National Elevation Dataset (NED). The NED data available on-line in 1 arc-second spacing from the US Geological Survey will be used for this analysis. The receptor grid (extent defined below) will include receptors only in UTM Zone 14. The NED data for this analysis will be based on North American Datum (NAD) 83 for horizontal locations and NAD88 for vertical locations (elevations).

The NED terrain file downloaded from the USGS will be provided on CD along with all other model I/O files.

RECEPTOR GRID

The receptor grid to be used for this analysis will include the vicinity of WEC, and will be extended sufficiently to encompass the locations of the three nearby SO_2 (Chief, AGP, PGS) emitting facilities to be included in the analysis. The receptor grid will include the following spacing on the WEC fence lines and at downwind distances from the nearest WEC fence lines.

- 50 meter spacing on the fence line
- 50 meter spacing from the fence to 1 kilometer from the fence
- 100 meter spacing from 1 kilometer to 2 kilometers from the fence
- 250 meter spacing from 2 kilometer to 5 kilometers from the fence
- 500 meter spacing from 5 kilometer to 7 kilometers from the fence
- 1000 meter spacing from 7 to 10 kilometers from the fence

In addition to the grid centered on WEC as described above, an enhanced density grid of additional receptors will be placed around each of the "nearby" sources to be modeled. These grids will extend out to at least one kilometer from each facility fence line, with 100-m spacing at PGS and 50-m spacing at the AGP and Chief sites.

The extent of the entire receptor grid as described above is shown in Figure 1.

Any hot spots in the 250 meter and coarser receptor spacing will be refined by performing a separate model run centered on the hot spot, with a 1000-meter by 1000-meter grid of 50-meter spacing centered on the highest impact receptor from the initial model run.

BACKGROUND CONCENTRATION

The background 1-hour SO_2 concentration will be based on data from a rural monitor located in Van Buren County, Iowa, with a site address of 24430 Lacey Trail (EPA Site ID number 191770006). This monitor is far from any nearby large SO_2 sources, and is located at approximately at the same latitude as Hastings, Nebraska, in a corn growing region. Given that the PPGA analysis will model all significant nearby SO2 sources, the rural Iowa monitoring site data are considered to be representative of background concentrations in rural areas of Nebraska (exclusive of nearby major source impacts). The background concentration will be based on the most recent three years (2013-2015) of data from this site. The table below shows the calculated average of the 99th percentile daily maximum 1-hour value as 7.9 µg/m^3 across the three years of Van Buren County data. Therefore, a background 1-hour SO_2 concentration of 8 µg/m^3 will be used for the Whelan Energy Center analysis.

Year	Daily Maximum 1-hour, 99th Percentile SO_2, Van Buren County, IA	
	(ppm)	(µg/m^3)
2013	3	7.9
2014	3	7.9
2015	3	7.9
Average	**3.0**	**7.9**

MODELING REPORT

A final modeling report will be submitted to NDEQ for review, describing modeling procedures (attaching this protocol), mitigation features (design changes), if any, proposed by the utility, and including all model and preprocessor input and output files on CD/DVD. The data on CD/DVD will include all the hourly emissions (CEM) data files used to input actual emissions to AERMOD.

The modeling report will contain graphics displaying, at a minimum,

- source locations,
- receptor locations,
- meteorological data locations,
- background monitor location,
- contour plots displaying modeled design values (for general receptor grid and any refined grid model runs), and
- a bar chart showing background plus source impact for comparison with the NAAQS.

A copy of the final modeling files used to support the analysis will be provided on CD/DVD to:

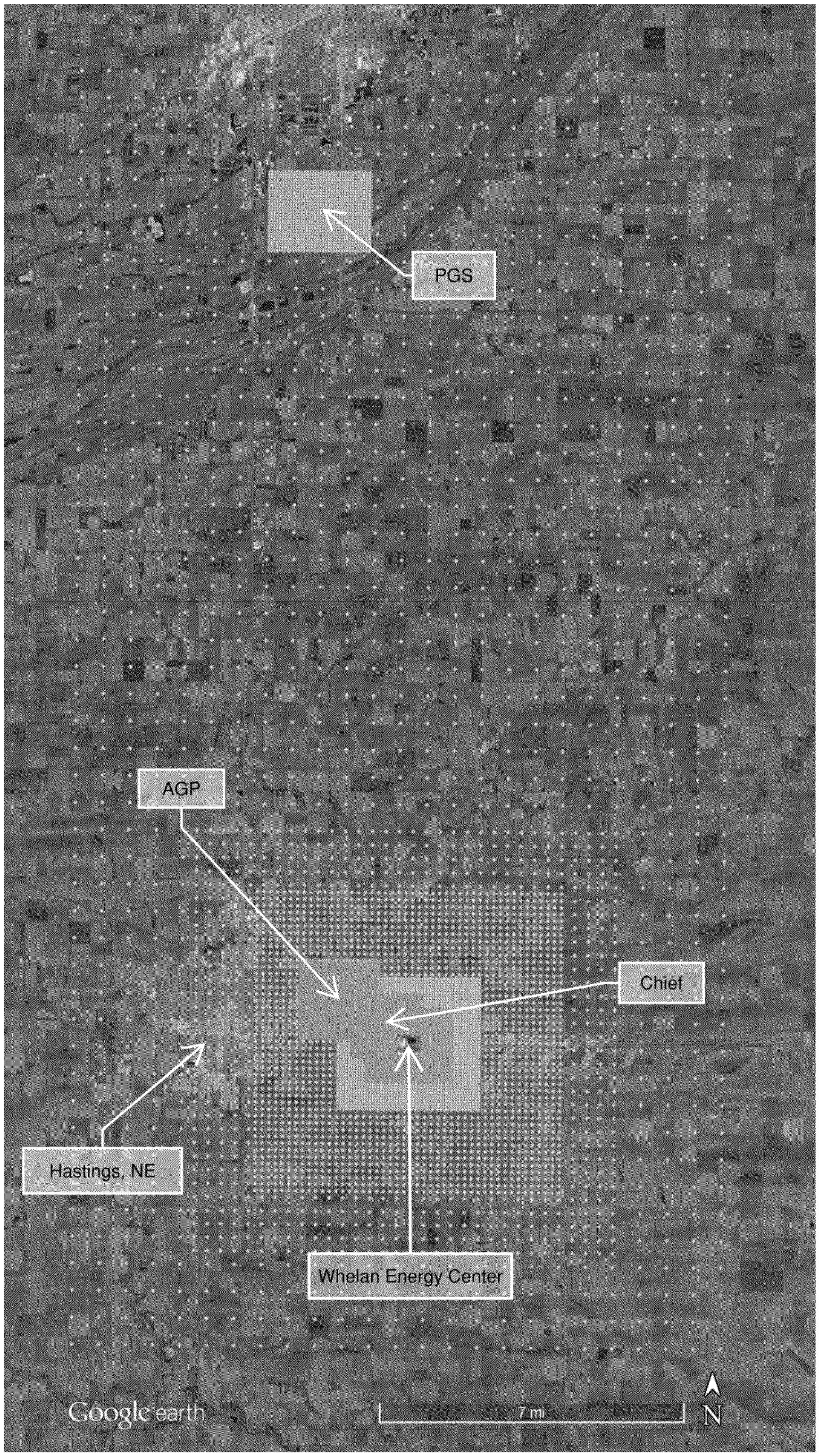
Lisa Alam
c/o Records Management
Nebraska Department of Environmental Quality
1200 "N" Street, Suite 400
P.O. Box 98922
Lincoln, Nebraska 68509-8922

The data and graphics files included on the CD/DVD will include as a minimum:

- AERMOD input and output files (source and receptor input data file, hourly emissions file, output listing file, and output graphics/plot file)
- Contour plot and bar chart graphics file(s)
- Source location graphic file (*.kml) from Google Earth
- Source, met data and background monitor location map/graphic
- AERMAP terrain data processor input file
- Preprocessed meteorological data (*.sfc and *.pfl) files provided by NDEQ

- BPIP-PRIME preprocessor input and output files

Figure 1. Receptor Grid for Whelan Energy Center SO_2 Dispersion Modeling



ED_001261_00009997

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Mon 6/20/2016 9:11:09 PM
Subject: RE: 1-Houe SO2 Background - used in Iowa

Thanks Lance-

I will try to call tomorrow, after talking to Jenifer at IDNR, since Brad Ashton is unavailable.

This is a protocol we are talking about – and while I want it completed ASAP – I'm also assuming that if there are changes to the approach once modeling begins, that can be documented at a later time.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Monday, June 20, 2016 2:01 PM
To: Alam, Lisa
Subject: RE: 1-Houe SO2 Background - used in Iowa

Hi Lisa,

It looks like Iowa has recently went to using the design value at one monitor (Van Buren) as its statewide default background (7 pbb) for 1-hr SO2:

http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Background-Data

Previously, their background TSD used an average of 4 SO2 monitors throughout the state to get its statewide background. This average of the 4 monitors value was what Iowa used in its 1-hr SO2 CD round modeling last year, and here is a description of their previous methodology:

IDNR chose the "first tier" approach but derived a statewide default background concentration using an average of the concentrations of four monitors using 2009-2011 data. The derived average background concentration was based on monitors from the following four cities in Iowa: Cedar Rapids, Davenport, Des Moines, and Keosauqua. While the averaging of multiple monitors is not outlined in the Modeling TAD, EPA Region 7 believes that this methodology provides a conservative background concentration for the facility area, which is located in rural Iowa. In contrast, the four monitors used in the average background concentration are located near higher populated areas and other sources of SO_2 emissions. In fact, IDNR no longer uses this averaging technique for sources in rural areas for this reason. IDNR is now using the Lake Sugema monitor for sources in rural areas since this monitor is located in a rural area. The Lake Sugema monitor has a design value of 7 μg/m^3, which is much lower than the background design value proposed in this analysis[1].

But for the their 1-hr SO2 DRR modeling this year, Iowa is going to use the new updated TSD and just the Van Buren county site for background.

So Iowa is updating their approach to use just 1 site. Averaging the backgrounds of Polk and Van Buren is an option, but I believe the best option and would be to use one of the somewhat conservative backgrounds from Van Buren, IA monitor (like Iowa is now) or Union County, SD monitor.

Please let me know of questions that you have.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Monday, June 20, 2016 9:36 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: 1-Houe SO2 Background - used in Iowa

Lance:

You mentioned to me on the phone that Iowa used an average of the two monitors in Polk and Van Buren to set a background concentration.

Am I recalling this accurately?

Did they have a justification or write-up in their protocols?

I'm asking on behalf of Ed Liebsch, HDR. I mentioned IDNR's 1-hour SO2 background determination, and Ed has requested me to track

down any documentation. I did a quick search using Google and kept running across their 2010 SO2 study. I could also call Iowa directly,

but I thought I'd start with you first.

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

Nebraska Department of Environmental Quality (NDEQ)

The Atrium Building, Suite 400, 1200 "N" Street, Lincoln, NE 68508-8922

Phone: 402-471-2925   FAX: 402-471-2909

Website: http://deq.ne.gov Click on "Focus on Air"

---

[1] http://www.iowadnr.gov/Portals/idnr/uploads/air/dispmodel/background_concentrations_tsd.pdf

To: Avey, Lance[Avey.Lance@epa.gov]
From: Ashton, Brad [DNR]
Sent: Thur 3/31/2016 2:36:13 PM
Subject: RE: SO2 modeling receptor grids

Lance,

Thank you for the additional information. I reviewed the TAD you provided. Based on that information, and the comment from Nealson below, it appears that the correct receptors were removed. With regard to receptors on the interchanges of major roadways, only those receptors that were on the on/off ramps, or completely surrounded by the ramps, were removed. Per the near-road monitoring TAD, these areas of removed receptors would be within the clear zones of the roadways, or in areas where access to the site or the necessary infrastructure for a monitor would not be feasible. Some receptors remain right up against the edges of the interchanges depending on where they fell in that area of the modeling domain.

Based on this guidance I will proceed with providing the updated receptor grid to ADM and IPL. Please let me know if you have any other comments or suggestions.

Thank you again for your assistance and prompt responses!

- Brad

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, March 31, 2016 7:02 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>
Subject: FW: SO2 modeling receptor grids

Hi Brad,

I am forwarding response from OAQPS regarding placement of receptor on highway interchanges for 1hr SO2 modeling. More of FYI so you can see their thoughts. I haven't read the near-road NO2 monitor placement TAD yet to see if it has any relevance to the Cedar Rapids modeling grid. Maybe you see something? But as of now, I do not have any problems with the updated 10km Cedar Rapids grid you provided on Monday.

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Watkins, Nealson
Sent: Wednesday, March 30, 2016 8:35 AM
To: Thurman, James <Thurman.James@epa.gov>
Cc: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: SO2 modeling receptor grids

OK, for the near-road NO2 network, we had generally discouraged the placement of sites “in” interchanges because of the complexity of the roadway design (where we have hard and fast rules about distances to the travel lanes of a target road) and safety and so on. However, getting nuzzled up to the approaches of the interchange is very do-able. We have a Technical Assistance Document on installing near-road NO2 sites that could be referenced for the logistical aspects of site placement that might be helpful here. Here is the link to that: https://www3.epa.gov/ttnamti1/files/nearroad/NearRoadTAD.pdf

I’ll be happy to help answer more questions, even specific ones about certain interchanges, if needed.

Thanks,

Nealson Watkins

US EPA - Office of Air and Radiation

Office of Air Quality Planning and Standards

Research Triangle Park, NC

919-541-5522

watkins.nealson@epa.gov

From: Thurman, James
Sent: Wednesday, March 30, 2016 9:28 AM
To: Watkins, Nealson <Watkins.Nealson@epa.gov>
Cc: Avey, Lance <Avey.Lance@epa.gov>
Subject: FW: SO2 modeling receptor grids

Sorry about that, here's the image Lance sent

James A. Thurman, Ph.D.

U.S. EPA/OAQPS/AQAD

Air Quality Modeling Group (C439-01)

109 T.W. Alexander Drive

Research Triangle Park, NC 27711

Phone: (919) 541-2703

Fax: (919) 541-0044

Email: thurman.james@epa.gov

From: Avey, Lance
Sent: Tuesday, March 29, 2016 3:56 PM
Subject: SO2 modeling receptor grids

Hi James,

Quick question, do you have thoughts on placing receptors on highway interchanges for 1-hr SO2 modeling? Attached is the receptor grid from a DRR protocol from Iowa. The highway interchanges are shown in the yellow circles on the attached image.

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

To: Avey, Lance[Avey.Lance@epa.gov]
Cc: Hawkins, Andy[hawkins.andy@epa.gov]; Hamilton, Heather[Hamilton.Heather@epa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]; McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]
From: Ashton, Brad [DNR]
Sent: Fri 3/11/2016 5:03:10 PM
Subject: RE: SO2 Designation Grid

Lance,

Thank you for the additional information.

We will plan to provide some additional justification for the CD analyses. For George Neal we did extend the grid out to address the high concentrations near the edge of the original analysis.

For the DRR sources we will plan to extend the grids out to at least 10 km and will provide the justification you describe for whatever grid extent ends up being used.

- Brad

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Thursday, March 10, 2016 3:24 PM
To: Ashton, Brad [DNR]
Cc: Hawkins, Andy; Hamilton, Heather; Johnson, Matthew [DNR]; McGraw, Jim [DNR]
Subject: RE: SO2 Designation Grid

Hi Brad,

OAQPS wanted beefed up justification for the use of 5 km modeling grid, as Consent Decree 1-hr SO2 source modeling saw all sorts of different size modeling domains and 5 km being the smallest. Overall, IDNR's discussion of nearby sources in the TSD for 1-hr CD SO2 modeling was well done, and the lack of major SO2 sources within 20 km of the 3 CD facilities modeled gives some good justification for using a 5km grid. Further, a discussion of the nearby terrain and if there is (or not) any elevated terrain beyond the 5km grid would provide additional justification.

What caused some issues with the 5km grid, was that George Neal, with the tall stacks and emissions from the North Unit, saw high SO2 concentrations at the edge the 5km grid to the northwest of GNN. And if there may be some higher terrain beyond 5km above the Missouri River valley, that elevated area may be where we would see the maximum modeled concentrations if the grid was expanded to say 10km. This was not an issue for Ottumwa and Burlington. So an evaluation and discussion of the model results at the grid edges can be used as further weight-of-evidence that the maximum concentration is within the chosen grid. However, this can be tough because the results are not known until after the modeling is performed.

For isolated sources without any or very few nearby SO2 sources, OAQPS did not raise any issues with the use of a 10km grid in those situations. However, that is not to say a 10km grid is preferred. I would believe any grid size between 5 and 50 km would be ok if the justification is there based on a technical discussion of nearby sources, terrain, and any modeling results at the grid edges.

I hope this helps, let me know of further questions.

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Thursday, March 10, 2016 1:05 PM
To: Avey, Lance <Avey.Lance@epa.gov>
Cc: Hawkins, Andy <hawkins.andy@epa.gov>; Hamilton, Heather <Hamilton.Heather@epa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>; McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>
Subject: SO2 Designation Grid

Lance,

Thank you for the information you provided today regarding EPA's position on the extent of the receptor grid in the SO2 designations modeling. Can you tell me what domain size OAQPS would consider appropriate to address their concern for national consistency?

- Brad

To: Hawkins, Andy[hawkins.andy@epa.gov]; Abdul, Assem[assem.abdul@dnr.mo.gov]
Cc: patricia.maliro@dnr.mo.gov[patricia.maliro@dnr.mo.gov]; Hall, Stephen[stephen.hall@dnr.mo.gov]; Avey, Lance[Avey.Lance@epa.gov]; Peter, David[peter.david@epa.gov]; Algoe-Eakin, Amy[Algoe-Eakin.Amy@epa.gov]; Grooms, Leland[Grooms.Leland@epa.gov]; Bybee, Darcy[darcy.bybee@dnr.mo.gov]
From: Wilbur, Emily
Sent: Fri 3/4/2016 7:28:01 PM
Subject: RE: monitoring siting

Hi Andy,

Sorry I missed your call yesterday. I was at the Regform meeting. But it sounds like you spoke with Assem and he was able to help you with our modeling analysis. I have placed all of our Buick modeling files/analyses on our ftp site. You should be getting a separate email for that. If you do not receive it, please let me know. We are drafting a report to go along with it, but since it's still in draft, I did not include the document. We hope to be finished with it soon. But the supporting files should all be contained in the ftp package I sent you.

If you have any questions on the modeling, please let me know!

Thanks,

Emily

From: Hawkins, Andy [mailto:hawkins.andy@epa.gov]
Sent: Thursday, March 03, 2016 9:45 AM
To: Wilbur, Emily; Abdul, Assem
Cc: Maliro, Patricia; Hall, Stephen; Avey, Lance; Peter, David; Algoe-Eakin, Amy; Grooms, Leland
Subject: FW: monitoring siting

Emily/Assem,

Does the attached preliminary map modeling summary reflect the results of MDNR's technical analysis? Do you know if this modeling reflects the onsite met data at BRRF? Was a frequency analysis of daily maximums also performed? The statement below “we imagine placing two monitors”, does that mean two monitors in addition to the current monitor location?

Any information you can provide on this attached modeling map or your modeling would be much appreciated as it appears preliminary sites are being selected and this is the first Lance or I have seen an analysis supporting monitor locations. Last I knew, via phone discussions with Assem, he had identified via modeling using TAD guidance some predicted locations higher than the current monitoring location, but I’ve not seen any of the MDNR modeling or results. Lance and I will need to understand the basis of these model results and it would be good to have that information to inform Lee’s visit, if possible.

TIA,
Andy

Andy Hawkins

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7179 office

hawkins.andy@epa.gov

From: Peter, David
Sent: Wednesday, March 02, 2016 1:30 PM
To: Algoe-Eakin, Amy <Algoe-Eakin.Amy@epa.gov>
Cc: Hawkins, Andy <hawkins.andy@epa.gov>; Avey, Lance <Avey.Lance@epa.gov>; Meyer, Jonathan <Meyer.Jonathan@epa.gov>
Subject: FW: monitoring siting

FYI…

From: Maliro, Patricia [mailto:patricia.maliro@dnr.mo.gov]
Sent: Wednesday, March 02, 2016 1:27 PM
To: Grooms, Leland <Grooms.Leland@epa.gov>
Cc: Peter, David <peter.david@epa.gov>; Hall, Stephen <stephen.hall@dnr.mo.gov>; Giroir, Eric <eric.giroir@dnr.mo.gov>
Subject: FW: monitoring siting

Lee,

Eric Giroir in monitoring unit has arranged with Doe Run Buick to review potential SO2 monitoring sites near BRRF on Monday, March 7, 2016. Please let us know if your schedule will allow you join Eric on this trip; we can forward you additional contact information regarding the trip. A preliminary map from Doe Run Buick showing possible locations for monitoring is attached.

Thank you and let me know if you have any questions.

Patricia Maliro

Air Monitoring Unit Chief

Air Pollution Control Program

Missouri Department of Natural Resources

1659 East Elm St. Jefferson City, MO 65102

(573) 751-0750

patricia.maliro@dnr.mo.gov

Promoting, Protecting and Enjoying our Natural Resources. Learn more at dnr.mo.gov.

From: Crocker, Margaret [mailto:mcrocker@doerun.com]
Sent: Tuesday, February 02, 2016 5:04 PM
To: Wilbur, Emily
Cc: joseph@shellengr.com; Hall, Stephen; Bybee, Darcy; Abdul, Assem; Maliro, Patricia; Bodnar, Gen
Subject: RE: monitoring siting

Hi all,

I have attached a preliminary map showing the top 100 receptors (Average 4th highest modeled concentrations) in red. They are concentrated directly west of the plant entrance and east of the facility along the ambient boundary. At this point we imagine placing two monitors. One monitor directly across from the facility's entrance from Hwy KK on Doe Run Property and another monitor near the eastern ambient border, in the southern 1/3 of the red receptors, which is also Doe Run property.

If you have questions about this map or the proposed locations please let me know. I will coordinate a visit with the monitoring unit and we will look at the specific locations then.

Thanks,

Maggie Crocker

EHS Analyst

The Doe Run Company

573-626-3499

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Tue 3/1/2016 8:43:02 PM
Subject: RE: 1-hr SO2 Data Requirements Rule (Round 3) Info

Lance:

Thank you for your time.

And as for the other question – that's good news, I think.

Coordinated Universal Time Code (UTC). - In other words, GMT.

I've asked this question before and was given this same guidance, that NWS ASOS data is in GMT, and I have to adjust the hours to LST

Usually by 6 hours in Nebraska.

Today I received a "W70" error message

W70 - The LST to GMT conversion appears to be incorrect. Based on the longitude provided,

the (elementary) computation of the time zone does not agree with the conversion

parameter (tadjust) on the LOCATION keyword

I've checked several *.ish files, and some have LST embedded all over the files, and some don't. I've worked with various NWS files over

the years, and grown accustomed to every NWS office using their own format for recording data, but that shouldn't effect ASOS data. The

data is gathered remotely.

And …

I've been plotting hourly impacts, and the highest impacts are occurring night, as they should. If I were six hours off, those curves would have

been shifted by 6 hours.

I will carry on, but I'm still curious as to why some data is labeled TIME (LST)

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, March 01, 2016 2:20 PM
To: Alam, Lisa
Subject: RE: 1-hr SO2 Data Requirements Rule (Round 3) Info

Hi Lisa,

I see, the only possible questionable source that is not on the current list that had one of the years between 2013-2015 with > 2,000 tpy would be the Lon D. Wright Plant in Fremont. But, I am not sure if my office is going to look to add Lon D. Wright to Nebraska's provided list at this time, more of the policy folks call here, and I am really not sure what their plan is.

On your other question, looking at:

ftp://ftp.ncdc.noaa.gov/pub/data/noaa/ish-format-document.pdf

I found:

GEOPHYSICAL-POINT-OBSERVATION time

The time of a GEOPHYSICAL-POINT-OBSERVATION based on

Coordinated Universal Time Code (UTC).

MIN: 0000 MAX: 2359

Thanks

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, March 01, 2016 1:24 PM
To: Avey, Lance <Avey.Lance@epa.gov>

Subject: RE: 1-hr SO2 Data Requirements Rule (Round 3) Info

Lance:

I've seen that document, but I felt I needed to make certain since there's been some confusion.

Quick question:

GMT to LST? I just ran across a warning from AERMET that my conversion may not be correct.

From the AERMET User Guide:

LOCATION keyword also defines the number of hours required to convert the time of each data record to local standard time (LST). For stations west of Greenwich, this value is specified as a positive number. ***Since most formats reporting hourly surface observations use local standard time, the conversion is usually 0***, which is the default value. Therefore, if this adjustment is zero, this parameter can be omitted. If data are reported in GMT, then the number of time zones west (positive number) or east (negative number) of Greenwich is specified.

Is NWS ASOS met data on the ftp Web site in LST or GMT?

ftp://ftp.ncdc.noaa.gov/pub/data/noaa/

I've gone through every document and I can't find any verification.

However, in the *.ish files I find

015572552594949201001010053 7+40604-098427FM-15+0596KHSI V0209999C000052200059N0112655N5-01335

<snip>

MAX TEMP (F):19 24 HR MAX TEMP TIME (LST)

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, March 01, 2016 11:32 AM
To: Alam, Lisa
Subject: RE: 1-hr SO2 Data Requirements Rule (Round 3) Info

Hi Lisa,

I attached the sources for Nebraska we received from Carrie Weiss. She may know better than me about the determination. So I would chat with her. But, I believe it is if any year from 2013-2015 had annual emissions > 2,000 tpy according to Air Markets. But that could be wrong, and may be the annual averaged emissions from 2013-2015 > 2,000 tpy.

Thanks

Lance

Lance Avey

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11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Alam, Lisa [mailto:lisa.alam@nebraska.gov]
Sent: Tuesday, March 01, 2016 8:22 AM
To: Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-hr SO2 Data Requirements Rule (Round 3) Info

Lance:

Is there guidance to determine which facilities are above this 2000 tpy rate?

I have in my notes that I should use 2011 data, and I also have in my notes I should use 2012 data, from Air Markets Program Data. Which is it?

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Monday, February 29, 2016 4:04 PM
To: Alam, Lisa
Cc: Hawkins, Andy
Subject: 1-hr SO2 Data Requirements Rule (Round 3) Info

Hi Lisa,

Passing along information on Round 3 of the 1-hr SO2 designation process. Here is a Fact Sheet from EPA's SO2 implementation page with a timeline:

https://www3.epa.gov/airquality/sulfurdioxide/pdfs/so2_drr_fs_081215.pdf

Please check it out, and let me know of questions. Of note:

For source areas that an air agency decides to evaluate through air quality modeling, the air agency must provide a modeling protocol to the EPA Regional Administrator by July 1, 2016. The modeling analysis must be submitted to the EPA by January 13, 2017.

Hope this helps,

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

To: Avey, Lance[Avey.Lance@epa.gov]
From: Alam, Lisa
Sent: Tue 3/1/2016 7:24:29 PM
Subject: RE: 1-hr SO2 Data Requirements Rule (Round 3) Info

Lance:

I've seen that document, but I felt I needed to make certain since there's been some confusion.

Quick question:

GMT to LST? I just ran across a warning from AERMET that my conversion may not be correct.

From the AERMET User Guide:

LOCATION keyword also defines the number of hours required to convert the time of each data record to local standard time (LST). For stations west of Greenwich, this value is specified as a positive number. ***Since most formats reporting hourly surface observations use local standard time, the conversion is usually 0***, which is the default value. Therefore, if this adjustment is zero, this parameter can be omitted. If data are reported in GMT, then the number of time zones west (positive number) or east (negative number) of Greenwich is specified.

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However, in the *.ish files I find

01557255259494920100101005З7+40604-098427FM-15+0596KHSI
V0209999C000052200059N0112655N5-01335

<snip>

MAX TEMP (F):19 24 HR MAX TEMP TIME (LST)

****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

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Lance

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Sent: Tuesday, March 01, 2016 8:22 AM
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****

Lisa M. Alam / Environmental Engineer / Air Dispersion Modeling

Air Program Planning and Development Team, Air Quality Division

(402) 471-2925

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To: Alam, Lisa
Cc: Hawkins, Andy
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Please check it out, and let me know of questions. Of note:

For source areas that an air agency decides to evaluate through air quality modeling, the air agency must provide a modeling protocol to the EPA Regional Administrator by July 1, 2016. The modeling analysis must be submitted to the EPA by January 13, 2017.

Hope this helps,

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

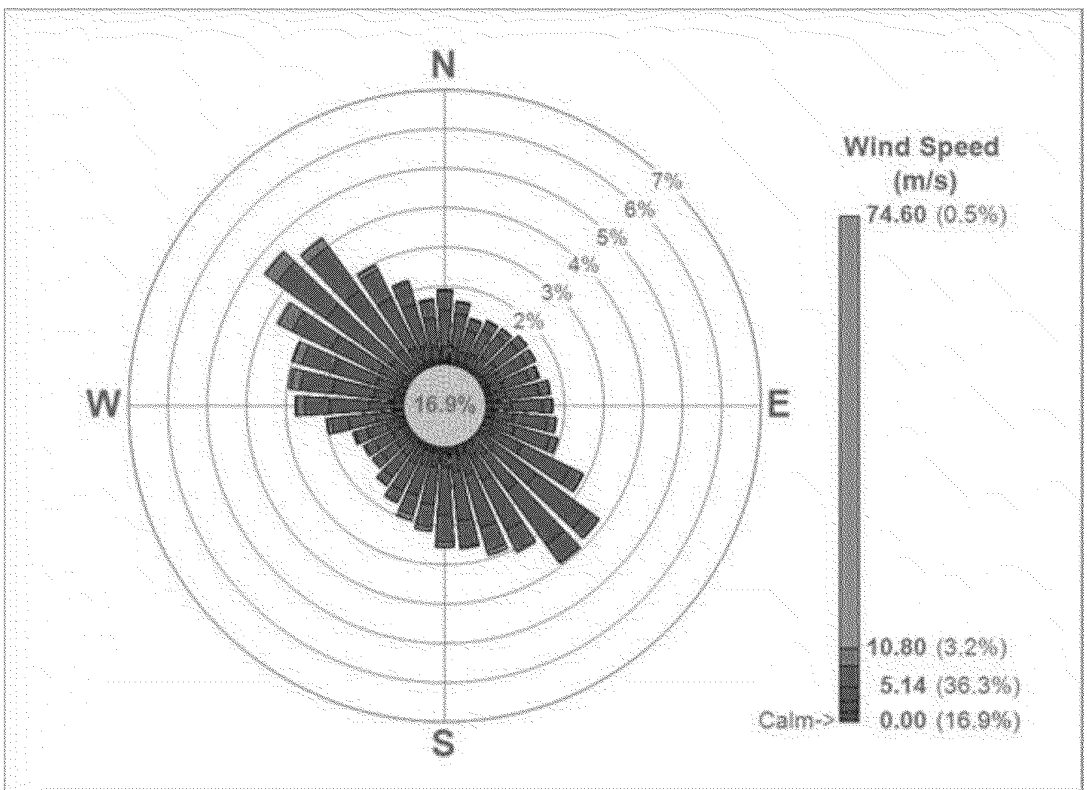
To: Avey, Lance[Avey.Lance@epa.gov]
From: Ashton, Brad [DNR]
Sent: Wed 12/23/2015 9:04:19 PM
Subject: RE: SO2 Data Requirements Rule Modeling Protocols

Lance,

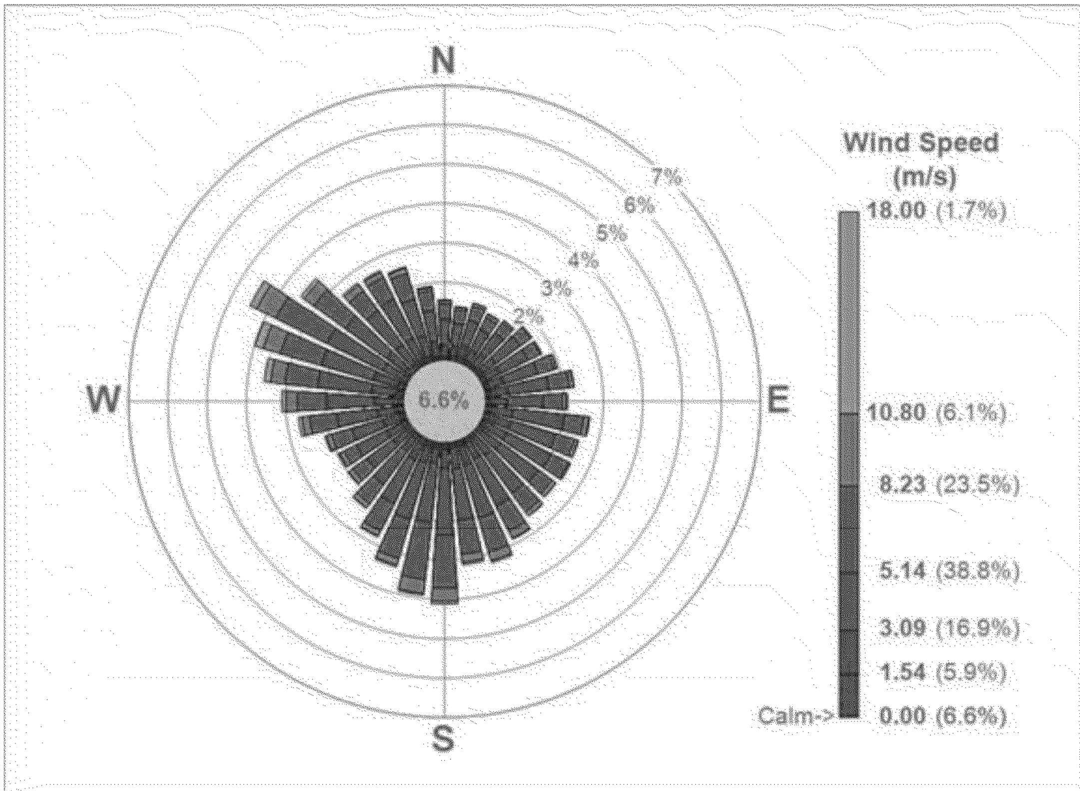
Thank you for your review and comments.

Regarding the lack of receptors in the NAA, the assumption is that the inclusion of Louisa in the Muscatine Non-Attainment modeling would take care of any potential impacts they may have in the NAA. You are correct though that the NA modeling uses a different meteorological dataset. The main difference between the two is that the Southern component of the Davenport wind rose is mostly from the South while the Southern component of the Iowa City data is Southeasterly:

Iowa City:



Davenport:



Given this comparison do you feel that the inclusion of receptors in the NAA is needed?

- Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling
Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

WWW.IOWADNR.GOV

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From: Avey, Lance [mailto:Avey.Lance@epa.gov]
Sent: Tuesday, December 22, 2015 9:46 AM
To: Ashton, Brad [DNR] <Brad.Ashton@dnr.iowa.gov>; Hawkins, Andy <hawkins.andy@epa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: RE: SO2 Data Requirements Rule Modeling Protocols

Hi Brad,

Thank you for providing the modeling protocols. I am guessing that Louisa's impact on the Muscatine NAA is being evaluated in the Muscatine SIP? Just noticing that no receptors are being placed inside the NAA for Louisa evaluation. I know the SIP addresses that all of the NAA will show attainment, and thus the Louisa evaluation should be moot for that area. But with the southeast winds one would think the max impact from Louisa may be in the NAA to the north, and it would not hurt to place receptors there to see if the NAA is the area of max impact for Louisa, even if below the NAAQS. Lastly, does the Muscatine SIP use surface met from Iowa City like the protocol proposes for Louisa? Any big differences in met between the Davenport and IC stations?

Thanks and happy holidays,

Lance

Lance Avey

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7809

avey.lance@epa.gov

From: Ashton, Brad [DNR] [mailto:Brad.Ashton@dnr.iowa.gov]
Sent: Tuesday, December 15, 2015 3:07 PM
To: Hawkins, Andy <hawkins.andy@epa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>; Krzak, Jennifer [DNR] <Jennifer.Krzak@dnr.iowa.gov>; Johnson, Matthew [DNR] <Matthew.Johnson@dnr.iowa.gov>
Subject: SO2 Data Requirements Rule Modeling Protocols

Andy and Lance,

I have attached the modeling protocols for two of the facilities for which we will be performing modeling for the data requirements rule. I have also attached our responses to the protocols. Please take a look at these and let me know if you have any comments.

Thanks,

Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling
Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

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To: Hawkins, Andy[hawkins.andy@epa.gov]; Avey, Lance[Avey.Lance@epa.gov]
Cc: McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Krzak, Jennifer [DNR][Jennifer.Krzak@dnr.iowa.gov]; Johnson, Matthew [DNR][Matthew.Johnson@dnr.iowa.gov]
From: Ashton, Brad [DNR]
Sent: Tue 12/15/2015 9:07:05 PM
Subject: SO2 Data Requirements Rule Modeling Protocols
removed.txt
WalterScott_ModelingProtocol_121115.pdf
DNR response MidAm WS protocol_revision.pdf
Louisa_ModelingProtocol_121115.pdf
DNR response MidAm Louisa revised protocol.pdf

Andy and Lance,

I have attached the modeling protocols for two of the facilities for which we will be performing modeling for the data requirements rule. I have also attached our responses to the protocols. Please take a look at these and let me know if you have any comments.

Thanks,

Brad

BRAD ASHTON, Lead Worker – Dispersion Modeling
Iowa Department of Natural Resources

P 515.725.9527 | F 515.725.9501 | Brad.Ashton@dnr.iowa.gov

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Fields of Opportunities

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
CHUCK GIPP, DIRECTOR

December 15, 2015

Mr. Josh Mohr
Manager, Air Programs
MidAmerican Energy
4299 NW Urbandale Drive
P.O. Box 657
Des Moines, IA 50322

Re: Response to Revised SO_2 1-Hour NAAQS Attainment Designation Modeling Protocol for the Louisa Generating Station (58-07-001)

Dear Mr. Mohr,

The revised SO_2 1-hour National Ambient Air Quality Standards (NAAQS) attainment designation modeling protocol for the MidAmerican Louisa Generating Station was received via email on December 11, 2015 by the Iowa Department of Natural Resources (IDNR). The protocol addresses the modeling methodology to be utilized in attainment designations for the 2010 SO_2 1-hour NAAQS in the area around this facility. The facility proposes to perform the modeling analysis in accordance with the EPA's draft *SO_2 NAAQS Designations Modeling Technical Assistance Document* (December 2013). This submitted protocol has been reviewed by the DNR. The comments are in the same order as the protocol and only sections with comments are below.

Background Concentration

- On December 3, 2015 the DNR released updated statewide background concentrations. The new SO_2 1-hour concentration is now 7 $\mu g/m^3$. However, this revised concentration represents natural background in the absence of other emission sources. The proposal to use this background concentration is acceptable in this case because the DNR intends to incorporate the SO_2 emissions from nearby sources within the Muscatine non-attainment area into the modeling evaluation prior to submittal to EPA.

Nearby Sources of SO_2

- The proposal to evaluate only the emissions from the Louisa Generating Station is acceptable for this round of modeling. However, please be aware that the DNR intends to incorporate the SO_2 emissions from sources within the Muscatine non-attainment area into the modeling evaluation prior to submittal to EPA. This is necessary to ensure that those sources do not contribute to exceedances of the NAAQS in areas that were not evaluated as part of the non-attainment analysis.

The modeling protocol is acceptable as submitted with the caveats noted above. The DNR will submit the final protocol to the EPA and forward any comments they may have. In the interim please proceed with the modeling analysis as planned. If you have any questions or need additional information, please contact me at Brad.Ashton@dnr.iowa.gov or 515-725-9527.

Sincerely,

Brad Ashton
Environmental Specialist Senior
Air Quality Bureau

Fields of Opportunities

STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
CHUCK GIPP, DIRECTOR

December 15, 2015

Mr. Josh Mohr
Manager, Air Programs
MidAmerican Energy
4299 NW Urbandale Drive
P.O. Box 657
Des Moines, IA 50322

Re: Response to Revised SO_2 1-Hour NAAQS Attainment Designation Modeling Protocol for the Walter Scott Jr. Energy Center (78-01-026)

Dear Mr. Mohr,

The revised SO_2 1-hour National Ambient Air Quality Standards (NAAQS) attainment designation modeling protocol for the MidAmerican Walter Scott Jr. Energy Center was received via email on December 11, 2015 by the Iowa Department of Natural Resources (IDNR). The protocol addresses the modeling methodology to be utilized in attainment designations for the 2010 SO_2 1-hour NAAQS in the area around this facility. The facility proposes to perform the modeling analysis in accordance with the EPA's draft *SO_2 NAAQS Designations Modeling Technical Assistance Document* (December 2013). This submitted protocol has been reviewed by the DNR. The comments are in the same order as the protocol and only sections with comments are below.

The modeling protocol is acceptable as submitted. The DNR will submit the final protocol to the EPA and forward any comments they may have. In the interim please proceed with the modeling analysis as planned. If you have any questions or need additional information, please contact me at jennifer.krzak@dnr.iowa.gov or (515) 725-9532.

Sincerely,

Jennifer Krzak

Jennifer Krzak
Environmental Specialist
Air Quality Bureau

Cc: Brad Ashton, DNR

TECHNICAL MEMORANDUM

ch2m

MidAmerican Louisa Generating Station SO_2 Modeling Protocol

PREPARED FOR: MidAmerican Energy Company

PREPARED BY: CH2M HILL

DATE: November 23, 2015

MidAmerican Energy Company retained CH2M to conduct air dispersion modeling to aid in the attainment designation for the 2010 sulfur dioxide (SO_2) 1-hour National Ambient Air Quality Standard (NAAQS) in the area around its Louisa Generating Station. This modeling protocol is being prepared for the Iowa Department of Natural Resources (IDNR) for review and comment on the dispersion modeling approach proposed to demonstrate attainment with the standard.

The methods and approach to the dispersion modeling analysis are consistent with the Environmental Protection Agency (EPA) Guideline on Air Quality Models[1], IDNR Modeling Guidance[2], and the 1-hr SO_2 Modeling Technical Assistance Document[3].

Dispersion Model

The EPA recommended AERMOD modeling system is proposed for the analysis. The AERMOD model (Version 15181) will be used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD are also proposed:

- BPIP-Prime (Version 04274)
- AERMET (Pre-processed by IDNR, Version 15181)
- AERMAP (11103)

If there is version change to AERMOD prior to submitting the modeling analysis to IDNR, the most recent version of AERMOD will be utilized.

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD will be run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from IDNR and preprocessed by AERMAP

---

1 U.S. Environmental Protection Agency (EPA). 2005. *Appendix W of 40 CFR Part 51—Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, November.

2 IDNR, 2014. *Air Dispersion Modeling Guidelines – For Non-PSD, Pre-construction Permit Applications.* Environmental Services Division. Air Quality Bureau. Version 12-19-2014.

3 EPA. 2013a. *Draft SO_2 NAAQS Designations Modeling Technical Assistance Document.* Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division. December

- SO_2 pollutant keyword

Receptor Grid

The Louisa Generating Station is near the Muscatine SO_2 non-attainment area. Therefore, receptors are sited outside of the fence line boundary of the Louisa Generating Station and excluded from the nonattainment area. Receptor placement grid spacing is:

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 5 km
- 1,000 meters extending from 5 km to 10 km.

Consistent with Section 4.2 of EPA's December 2013 draft *SO_2 NAAQS Designations Modeling Technical Assistance Document,* receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Mississippi River. Figure 1 shows the receptor grid for the modeling analysis. The red outlined area in the figure is the Muscatine nonattainment area.

AERMAP (Version 11103) will be used to process terrain elevation data for all sources and receptors using National Elevation Dataset (NED) files prepared by IDNR[4] and the USGS. The IDNR terrain data were used for receptors within the supplied data limits. Receptors beyond the data limits of the IDNR supplied terrain data we processed with USGS NED data. AERMAP first determines the base elevation at each source and receptor. For complex terrain situations, AERMOD captures the physics of dispersion and creates elevation data for the surrounding terrain identified by a parameter called hill height scale. AERMAP creates hill height scale by searching for the terrain height and location that has the greatest influence on dispersion for each individual source and receptor. Both the base elevation and hill-height scale data are produced for each receptor by AERMAP as a file or files that can be directly accessed by AERMOD.

[4] http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Modeling/Dispersion-Modeling/Elevation-Data. Accessed October 2015

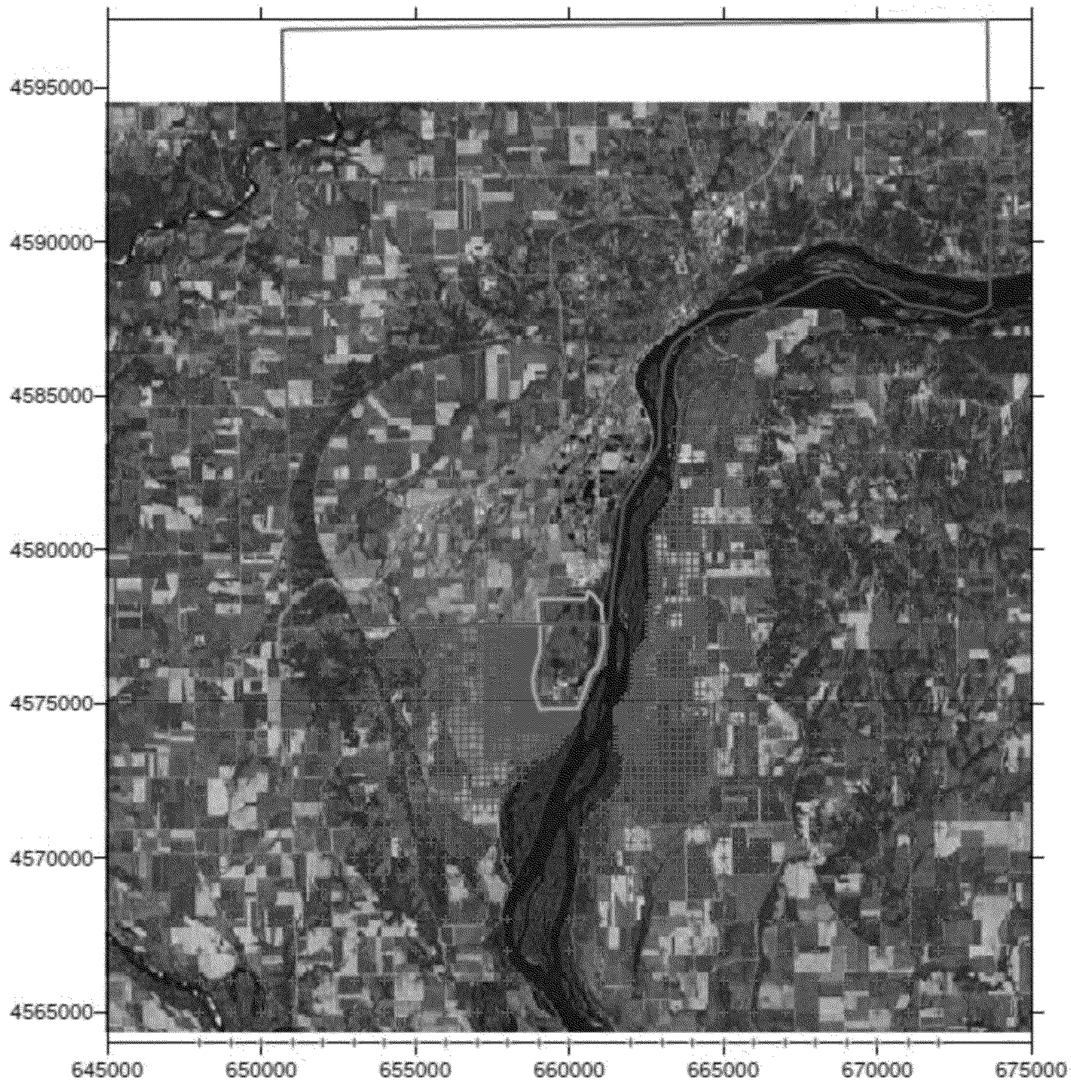


Figure 1. Modeling Receptor Grid

Meteorological Data

Hourly meteorological data for the dispersion modeling analysis were obtained from IDNR. These data were pre-processed with the AERMET program by IDNR. The data were collected from the Iowa City Airport, NE (KIOW) station for calendar years 2012 through 2014 and are considered representative of the conditions near the Louisa Generating Station. Figure 2 shows the 3-year wind rose for the KIOW station.

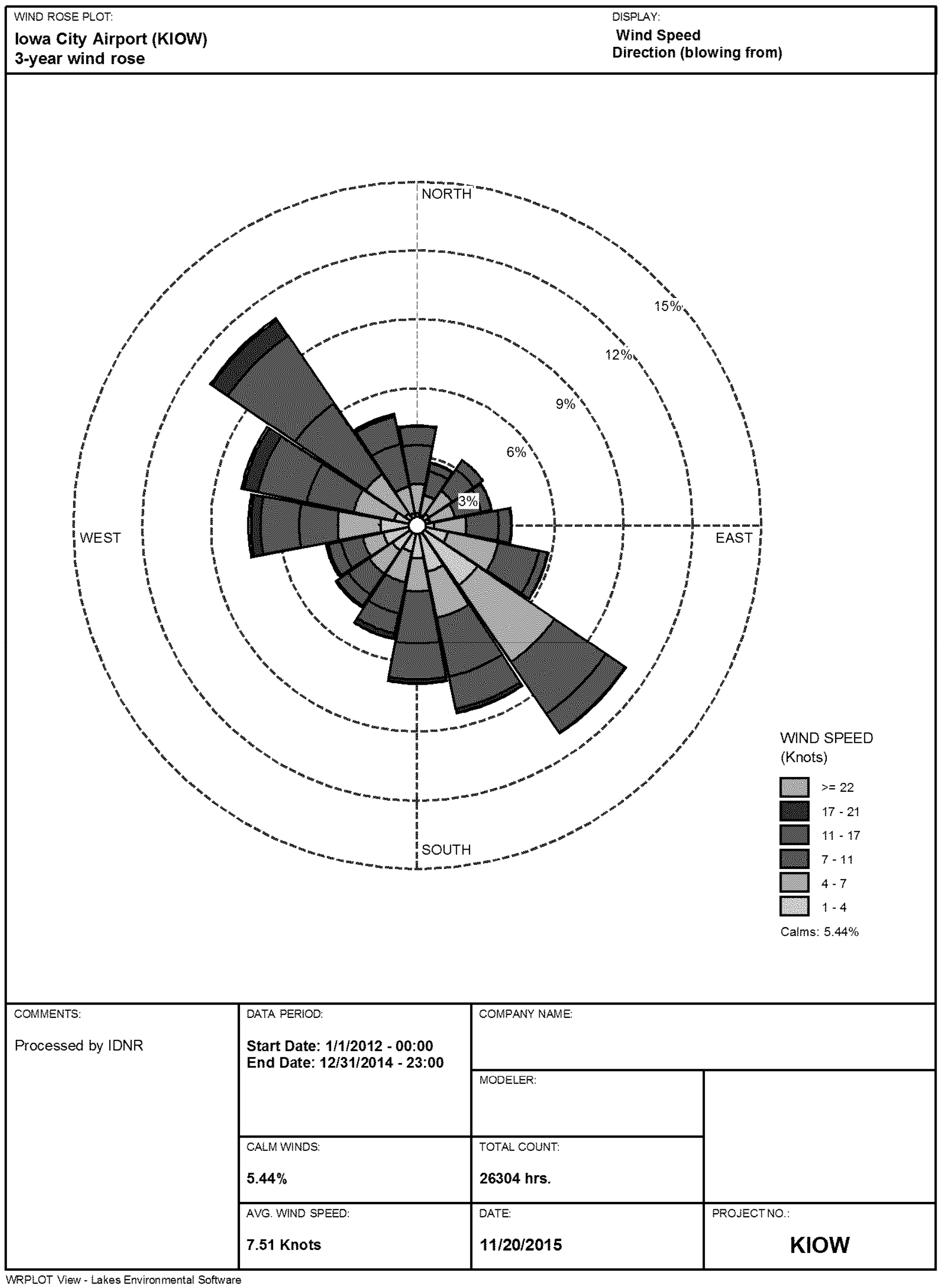


Figure 2. KIOW 3-year Wind Rose (2012-2014)

Background Concentration

IDNR Modeling guidance[5] recommends a statewide 1-hour SO_2 background concentration of 7 micrograms per cubic meter ($\mu g/m^3$). This conservative concentration will be added to the model design value for comparison to the 1-hour SO_2 NAAQS.

Model Design Value

The model design value will be used in conjunction with representative background concentrations for comparison to the NAAQS. For SO_2, consistent with EPA guidance[6], the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hour modeled concentration will be added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hour concentration at each receptor using the SO_2 pollutant keyword[7].

Nearby Sources of SO_2

As noted earlier, the Louisa Generating Station is located near the Muscatine nonattainment area for SO_2. Although there are major sources of SO_2 located within the nonattainment area, these sources were not included in the modeling analysis since it is anticipated that the State Implementation Plan (SIP) for SO_2 would limit the emissions from these sources to demonstrate attainment with the standard by the target data identified in the SIP. Therefore, no other major sources of SO_2 were included in the modeling analysis and any minor sources and regional sources would be included in the background concentration.

Source Characterization and Emission Rates

The Louisa Generating Station includes a number of emission units which emit SO_2. All emission units modeled in AERMOD will be characterized as point sources. Table 1 summarizes the emission units and stack characteristics to be used in the 1-hour SO_2 modeling demonstration. Small sources of SO_2, such as emergency generators and comfort heating, will not be included in the analysis as concentrations from these small sources of SO_2 would be considered as part of the background.

Table 1. Louisa Generating Station Point Source Exhaust Characteristics

Model ID	Unit Description	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
LGSEP01	Main Boiler	659586.2	4575826	176.95	185.93	9.14	355.4	25.78
LGSEP02	Auxiliary Boiler 1	659550.2	4575698	177.28	24.38	1.35	449.8	7.03
LGSEP03	Auxiliary Boiler 2	659546.2	4575698	177.29	24.38	1.35	449.8	7.03

5 http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/BackgroundData.aspx. Accessed December 2015.

6 EPA. 2013a. *Draft SO_2 NAAQS Designations Modeling Technical Assistance Document.* Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division. December

7 EPA. 2015. *Addendum: Users Guide for the AMS/EPA Regulatory Model – AERMOD.* Office of Air Quality Planning and Standards. Research Triangle Park, NC. June.

Table 1. Louisa Generating Station Point Source Exhaust Characteristics

Model ID	Unit Description	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)

Notes:
m: meters
K: degrees Kelvin
m/s: meters per second

The emission units at Louisa Generating Station will be modeled at their maximum potential SO_2 hourly emission rates. Table 2 summarizes the emissions to be used in the analysis.

Auxiliary Boiler 1 and Auxiliary Boiler 2 are considered natural gas units. They are limited to utilizing fuel oil intermittently. Therefore, the units will be modeled to represent normal operation with emission rates that reflect potential SO_2 emissions while utilizing natural gas as a fuel.

For the Main Boiler, the current 30-day rolling permit limit was used to develop an hourly emission rate per the approach outlined in the EPA G*uidance for 1-Hour SO_2 Nonattainment Area [State Implementation Plan] Submissions* memorandum released on April 23, 2014.

Based on this guidance, the following approach is proposed to develop a 1-hour emission rate for the attainment demonstration modeling of the two units.

1. Review existing continuous emission monitoring data for the Main Boiler at the Louisa Generating Station to develop a ratio of 30-day rolling averages to hourly emissions The ratio would be developed as 99^{th} percentile of the five year data from 2010 to 2014.
2. Use the ratio to develop hourly emission rate using the current 30-day rolling permit limit.
3. Utilize the 1-hour emission rate to demonstrate compliance with the standard with modeling.

The three step approach above resulted in a ratio of 0.8077. This ratio was then applied to the current 30-day rolling average permit limit of 3,449.6 pounds per hour, resulting in the modeled one-hour emission rate in Table 2 below.

Table 2. Modeled SO_2 Emission Rate

Model ID	Unit Description	SO_2 Emission Rate (lb/hr)
LGSEP01	Main Boiler	4,270.89
LGSEP02	Auxiliary Boiler 1	0.06
3	Auxiliary Boiler 2	0.06

Note:
lb/hr: pounds per hour
Emission rates reflect maximum CEM data

Presentation of Results

The results of the air dispersion modeling analyses will be presented as follows:

- A description of modeling methodologies and input data
- A summary of the results in tabular and, where appropriate, graphical and narrative form

- Modeling files used for AERMOD will be provided with the on a CD-ROM
- Any significant deviations from the methodology proposed in this protocol will be presented

************************* ATTACHMENT REMOVED *************************

This message contained an attachment which the administrator has caused to be removed.

************************* ATTACHMENT REMOVED *************************

Attachment name: [image001.jpg]
Attachment type: [image/jpeg]

TECHNICAL MEMORANDUM

ch2m

MidAmerican Walter Scott Jr. Energy Center SO_2 Modeling Protocol

PREPARED FOR: MidAmerican Energy Company

PREPARED BY: CH2M HILL

DATE: November 23, 2015

MidAmerican Energy Company retained CH2M to conduct air dispersion modeling to aid in the attainment designation for the 2010 sulfur dioxide (SO_2) 1-hour National Ambient Air Quality Standard (NAAQS) in the area around its Walter Scott Jr. Energy Center. This modeling protocol is being prepared for the Iowa Department of Natural Resources (IDNR) for review and comment on the dispersion modeling approach proposed to demonstrate attainment with the standard.

The methods and approach to the dispersion modeling analysis are consistent with the Environmental Protection Agency (EPA) Guideline on Air Quality Models[1], IDNR Modeling Guidance[2], and the 1-hr SO_2 Modeling Technical Assistance Document[3].

Dispersion Model

The EPA recommended AERMOD modeling system is proposed for the analysis. The AERMOD model (Version 15181) will be used with regulatory default options as recommended in the EPA Guideline on Air Quality Models. The following supporting pre-processing programs for AERMOD are also proposed:

- BPIP-Prime (Version 04274)
- AERMET (Pre-processed by IDNR, Version 15181)
- AERMAP (Pre-processed by IDNR)

If there is version change to AERMOD prior to submitting the modeling analysis to IDNR, the most recent version of AERMOD will be utilized.

AERMOD is a steady-state plume model that simulates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. This model is recommended for short-range (< 50 kilometers [km]) dispersion from the source. The model incorporates the Plume Rise Model Enhancement (PRIME) algorithm for modeling building downwash. AERMOD is designed to accept input data prepared by two specific pre-processor programs, AERMET and AERMAP. AERMOD will be run with the following options:

- Regulatory default options
- Direction-specific building downwash characterized by BPIP-PRIME
- Actual receptor elevations and hill height scales obtained from IDNR and preprocessed by AERMAP

[1] U.S. Environmental Protection Agency (EPA). 2005. *Appendix W of 40 CFR Part 51—Guideline On Air Quality Models (Revised)*, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, November.

[2] IDNR, 2014. *Air Dispersion Modeling Guidelines – For Non-PSD, Pre-construction Permit Applications.* Environmental Services Division. Air Quality Bureau. Version 12-19-2014.

[3] EPA. 2013a. *Draft SO_2 NAAQS Designations Modeling Technical Assistance Document.* Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division. December

- SO_2 pollutant keyword

Receptor Grid

Receptors were supplied by IDNR and are sited outside of the fence line boundary of the Walter Scott Jr. Energy Center. Receptor placement grid spacing is:

- 50 meters along the facility fence line
- 50 meters from the fence line to 0.5 km
- 100 meters extending from 0.5 km to 1.5 km
- 250 meters extending from 1.5 km to 3 km
- 500 meters extending from 3 km to 5 km

Consistent with Section 4.2 of EPA's December 2013 draft *SO_2 NAAQS Designations Modeling Technical Assistance Document,* receptors were not placed on water bodies within the gridded area. This would include removing receptors on the adjacent Missouri River. Figure 1 shows the receptor grid for the modeling analysis.

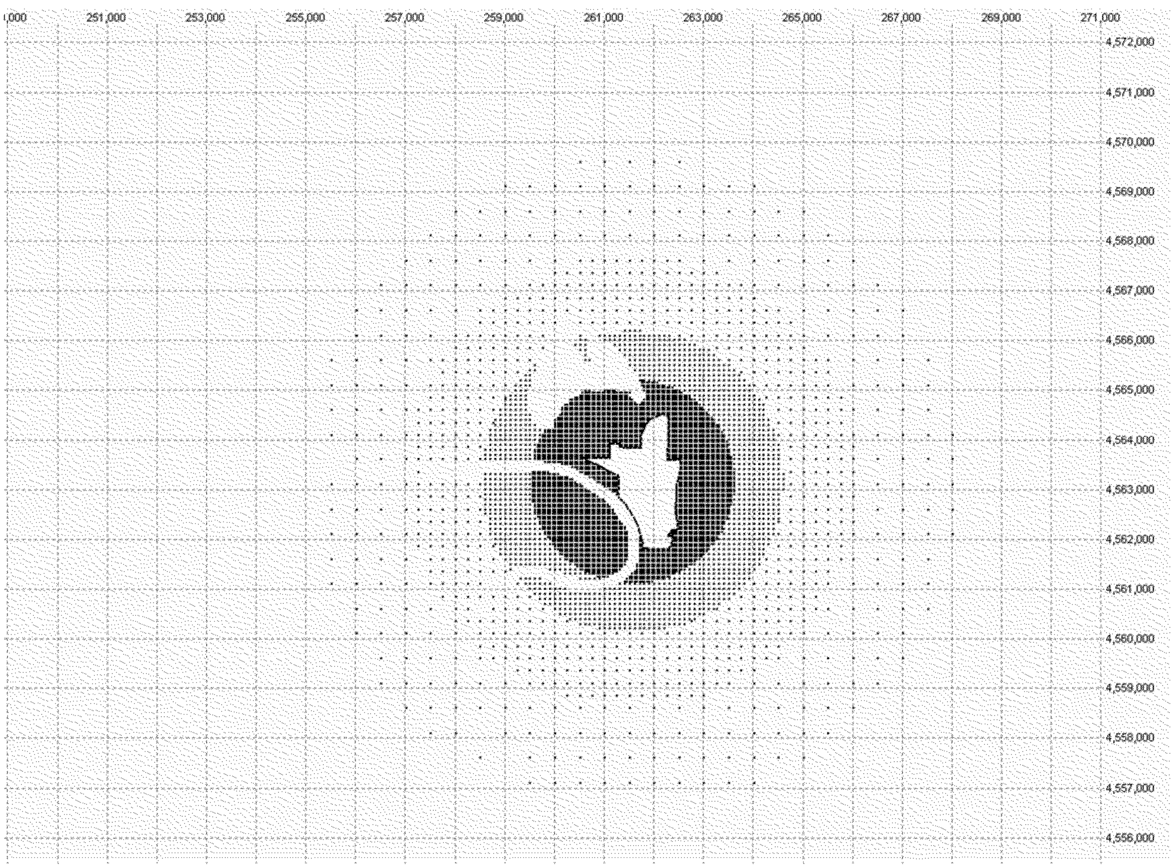


Figure 1. Modeling Receptor Grid

Meteorological Data

Hourly meteorological data for the dispersion modeling analysis were obtained from IDNR. These data were pre-processed with the AERMET program by IDNR. The data were collected from the Omaha, NE (KOMA) station for calendar years 2012 through 2014 and are considered representative of the

ED_001261_00010477

conditions near the Walter Scott, Jr. Energy Center. Figure 2 shows the 3-year wind rose for the KOMA station.

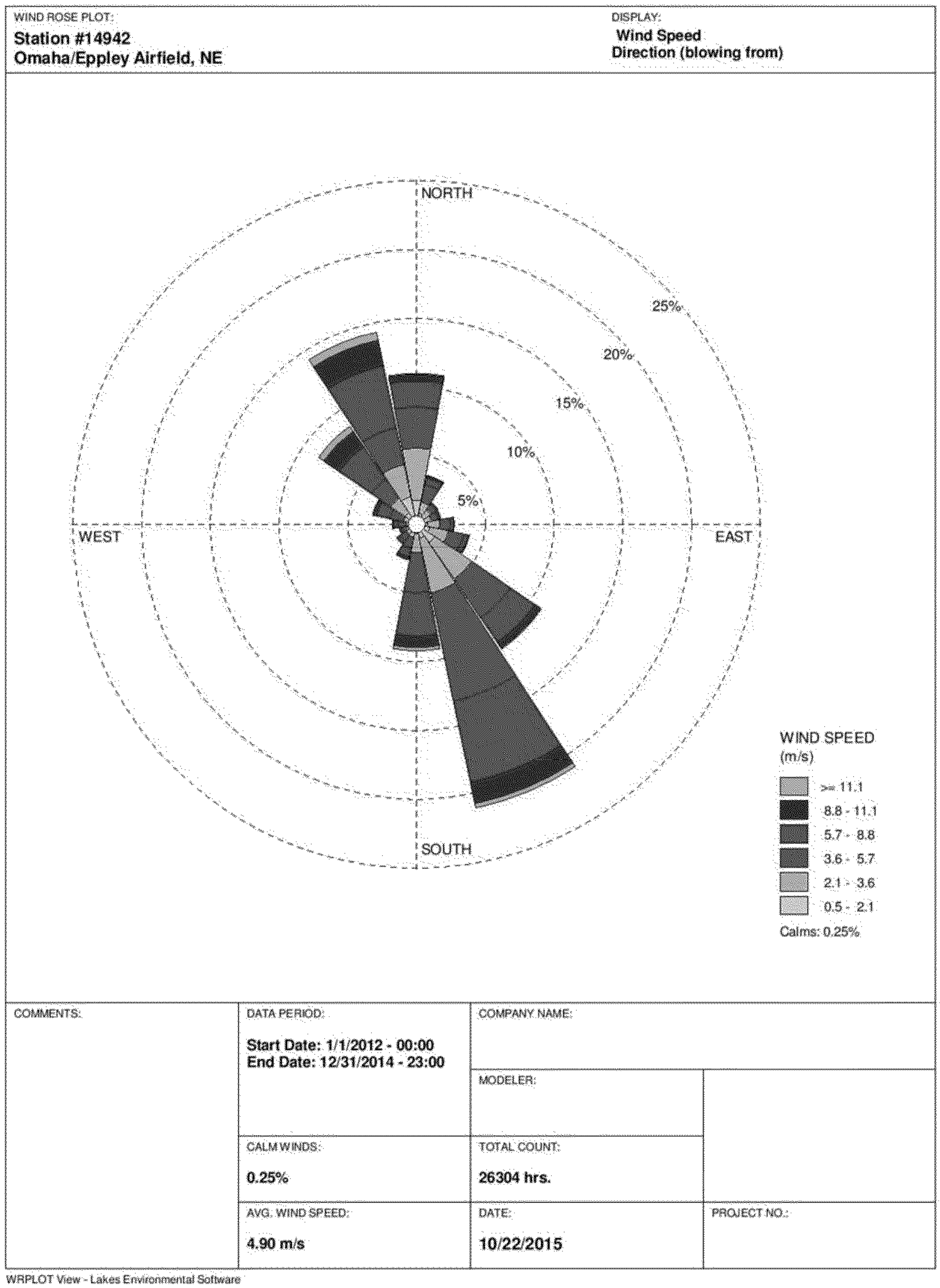


Figure 2. KOMA 3-year Wind Rose (2012-2014)

Background Concentration

IDNR Modeling guidance[4] recommends a statewide 1-hour SO_2 background concentration of 7 micrograms per cubic meter (µg/m^3). This conservative concentration will be added to the model design value for comparison to the 1-hour SO_2 NAAQS.

Model Design Value

The model design value will be used in conjunction with representative background concentrations for comparison to the NAAQS. For SO_2, consistent with EPA guidance[5], the receptor with the highest 3-year average of the 99th percentile maximum daily 1-hour modeled concentration will be added to the background concentration identified above. AERMOD internally calculates the 3-year average of the 99th percentile 1-hour concentration at each receptor using the SO_2 pollutant keyword[6].

Nearby Sources of SO_2

IDNR requested the nearby OPPD North Omaha Station be included in the 1-hour SO_2 modeling demonstration. No other sources of SO_2 were requested to be included in the modeling analysis and regional or small sources of SO_2 would be considered to be included in the background concentration.

Source Characterization and Emission Rates

Both the MidAmerican Walter Scott, Jr. Energy Center and OPPD North Omaha Station include a number of emission units that emit SO_2. All emission units modeled in AERMOD will be characterized as point sources. Table 1 summarizes the emission units and stack characteristics to be used in the 1-hour SO_2 modeling demonstration. Small sources of SO_2, such as emergency generators and comfort heating, will not be included in the analysis as concentrations from these small sources of SO_2 would be considered as part of the background.

Table 1. Walter Scott, Jr. Energy Center and Omaha Public Power District Point Source Exhaust Characteristics

Model ID	Unit Description	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)
EP003	WS Unit 3	261,898.22	4,562,476.92	294.72	167.64	7.62	355.37	28.977
EP141	WS Unit 4	262,145.9	4,562,589.8	294.70	167.945	7.5286	347.04	24.917
EP142	WS Unit 4 Aux. Boiler	262,017.0	4,562,476.0	294.50	88.392	1.753	427.59	20.537
OPPDA	Units 1-3	253,446.59	4,579,479.15	303.581	62.1792	4.42	422	36.58
OPPDB	Unit 4	253,421.41	4,579,505.24	303.581	62.1792	2.93	422	36.88
OPPDC	Unit 5	253,401.92	4,579,524.45	303.581	62.1792	3.51	422	36.58

[4] http://www.iowadnr.gov/InsideDNR/RegulatoryAir/Modeling/DispersionModeling/BackgroundData.aspx. Accessed December 2015.

[5] EPA. 2013a. *Draft SO_2 NAAQS Designations Modeling Technical Assistance Document.* Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division. December

[6] EPA. 2015. *Addendum: Users Guide for the AMS/EPA Regulatory Model – AERMOD.* Office of Air Quality Planning and Standards. Research Triangle Park, NC. June.

Table 1. Walter Scott, Jr. Energy Center and Omaha Public Power District Point Source Exhaust Characteristics

Model ID	Unit Description	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)

Notes:
WS: Walter Scott, Jr. Energy Center
OPPD: Omaha Public Power District North Omaha Station
m: meters
K: degrees Kelvin
m/s: meters per second
Aux: auxiliary

The emission units at Walter Scott Jr. Energy Center will be modeled at their maximum potential SO_2 hourly emission rates.

The Unit 4 Auxiliary Boiler is considered a natural gas unit. Its modeled emission rate reflect potential SO_2 emissions while utilizing natural gas as a fuel.

For Walter Scott Unit 3 and Unit 4, the current 30-day rolling permit limits were used to develop an hourly emission rate per the approach outlined in the EPA G*uidance for 1-Hour SO_2 Nonattainment Area [State Implementation Plan] Submissions* memorandum released on April 23, 2014.

Based on this guidance, the following approach is proposed to develop a 1-hour emission rate for the attainment demonstration modeling of the two units.

1. Review existing continuous emission monitoring data for each unit to develop a ratio of 30-day rolling averages to hourly emissions The ratio would be developed as 99th percentile of the five year data from 2010 to 2014.
2. Use the ratio to develop hourly emission rate using the current 30-day rolling permit limit.
3. Utilize the 1-hour emission rate to demonstrate compliance with the standard with modeling.

The three step approach above resulted in a ratio of 0.8174 for Unit 3 and 0.8436 for Unit 4. The current 30-day rolling average emission limits of 0.4 lbs/mmBtu for Unit 3 and 0.1 lbs/mmBtu for Unit 4 were then converted to pound per hour rates. The ratios calculated above were then applied to these pound per hour emission rates as listed in Table 2 below, and used in the modeling analysis.

Emission rates for the OPPD North Omaha Station were supplied by IDNR[7] and reflect maximum measured 1-hour average emission rates reported on the USEPA, Clean Air Markets.

Table 2 summarizes the emissions to be used in the analysis.

Table 2. Modeled SO_2 Emission Rate

Model ID	Unit Description	SO_2 Emission Rate (lb/hr)
EP003	Walter Scott, Jr. Energy Center Unit 3	3,768.0
EP141	Walter Scott, Jr. Energy Center Unit 4	909.79
EP142	Walter Scott, Jr. Energy Center Unit 4 Aux. Boiler	0.21

[7] Email from Jennifer Krzak/IDNR to Joshua Mohr/MidAmerican. Subject: *OPPD Potential Rates.* October 6, 2015.

Table 2. Modeled SO_2 Emission Rate

Model ID	Unit Description	SO_2 Emission Rate (lb/hr)
OPPDA	OPPD North Omaha Station Units 1-3	1,409.9
OPPDB	OPPD North Omaha Station Unit 4	651.6
OPPDC	OPPD North Omaha Station Unit 5	994.2

Note:
OPPD: Omaha Public Power District
lb/hr: pounds per hour
Emission rates reflect maximum CEM data

OPPD Emission Rate Consideration

As described above, the OPPD Omaha North Station emission rates are based on maximum hourly emissions from 2012 through 2014. These emissions will be used in the analysis to demonstrate attainment with the standard and represent a conservative estimate for the attainment analysis. OPPD plans on retiring Units 1-3 (Stack OPPDA) by April 2016 to coincide with the expiration of their extension for compliance under the Mercury and Air Toxics Standard (MATS). If the OPPD emissions increase significantly in the future compared to what is being modeled, a revised modeling analysis may be required to demonstrate attainment with the 1-hour SO2 NAAQS. IDNR will track the emissions from the OPPD Omaha North Station and notify MidAmerican Energy Company if additional modeling would be warranted.

Presentation of Results

The results of the air dispersion modeling analyses will be presented as follows:

- A description of modeling methodologies and input data
- A summary of the results in tabular and, where appropriate, graphical and narrative form
- Modeling files used for AERMOD will be provided on a CD-ROM
- Any significant deviations from the methodology proposed in this protocol will be presented

To: matthew.johnson@dnr.iowa.gov[matthew.johnson@dnr.iowa.gov]
Cc: McGraw, Jim [DNR][jim.mcgraw@dnr.iowa.gov]; Hamilton, Heather[Hamilton.Heather@epa.gov]; Hawkins, Andy[hawkins.andy@epa.gov]; Avey, Lance[Avey.Lance@epa.gov]
From: Peter, David
Sent: Tue 10/6/2015 5:25:23 PM
Subject: FW: SO2 data requirements rule - potential to emit question

Matthew,

I agree with you that, in the case where a permit restricts the source to burning natural gas only, the permit would not need a numerical SO2 limit. I think that it may make some sense for the permit writer notes to make some reference that the “new” facility-wide PTE is less than 2,000 tpy for Round 3 SO2 designation purposes, just for historical reference.

David Peter

Environmental Engineer

U.S. EPA Region 7, Air Permitting Branch

11201 Renner Boulevard

Lenexa, KS 66219

913-551-7397

From: Hamilton, Heather
Sent: Tuesday, October 06, 2015 10:34 AM
To: Peter, David <peter.david@epa.gov>
Cc: Hawkins, Andy <hawkins.andy@epa.gov>; Avey, Lance <Avey.Lance@epa.gov>
Subject: FW: SO2 data requirements rule - potential to emit question

Can you respond to Matthew and “cc” me? Thanks!

From: Johnson, Matthew [DNR] [mailto:Matthew.Johnson@dnr.iowa.gov]
Sent: Tuesday, October 06, 2015 10:23 AM
To: Hamilton, Heather <Hamilton.Heather@epa.gov>
Cc: McGraw, Jim [DNR] <jim.mcgraw@dnr.iowa.gov>
Subject: SO2 data requirements rule - potential to emit question

Hello Heather,

Under the SO2 Data Requirements Rule (DRR) one option allows the establishment of federally enforceable limits that keep the SO2 potential to emit below 2000 tons per year. Would a permit requirement that restricts the source to burning natural gas only satisfy this requirement? Can EPA confirm a numerical SO2 limit in this case is not necessary? (Any affected source in Iowa burning natural gas only would not physically be capable of emitting 2,000 tpy of SO2, so a numerical SO2 limit would seem unnecessary for purposes of the DRR.)

Thank you,

Matthew

MATTHEW JOHNSON, Long Range Planning & Regional Modeling
Iowa Department of Natural Resources

P 515.725.9554 | F 515.725.9501 | matthew.johnson@dnr.iowa.gov

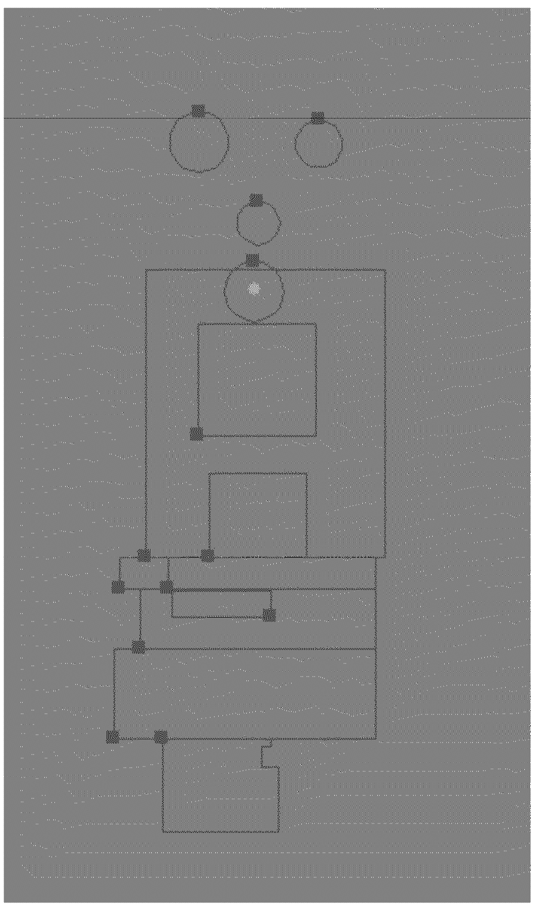
Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692
WWW.IOWADNR.GOV
Leading Iowans in Caring for Our Natural Resources.

To: Hawkins, Andy[hawkins.andy@epa.gov]; Tiffany M. Le[tle@bpu.com]; Lynn Deahl[LDeahl@kdheks.gov]
Cc: Ingrid Setzler[isetzler@bpu.com]; Avey, Lance[Avey.Lance@epa.gov]
From: Kasi Dubbs
Sent: Fri 9/25/2015 7:21:43 PM
Subject: RE: 1-Hour SO2 Modeling
Attainment Modeling_v2.0_Urban.ami
Attainment Modeling_v2.0_Urban.aml

All - I shifted the stack and reran the model and results went down a smidge. See the stack placement and new results below. Modeling files are attached.

Revised stack location



-

Results (see revised numbers in yellow)

Attainment Modeling Results

Source	Modeled Emission Rate (lb/hr)	Highest Concentration[1] (µg/m³)	
BPU - Nearman N1	3 Year CEMS	159	157.514
Veolia Energy - EP1	0.5	0	0.132
Veolia Energy - EP2	351.8	75	74.811
Veolia Energy - EP3	0.5	0	0.102
Independence Power & Light - Missouri City EP5	681.9	10	9.577
Independence Power & Light - Missouri City EP6	0.3	0	0.017
KCP&L GMO - Sibley EP5A	2,018.69	11	10.750
KCP&L GMO - Sibley EP5B	1,989.44	11	10.594
KCP&L GMO - Sibley EP5C	13,964.01	74	74.360
KCP&L - Hawthorn EP6	1,529.88	31	31.461
Missouri Sources	--	118	117.518
Combined Sources	--	160	158.441

[1]Background concentration = 33.57 ug/m3 and is not added in here.

....

Kasi Dubbs, P.E.
Managing Consultant

Trinity Consultants

9777 Ridge Drive, Suite 380 | Lenexa, Kansas 66219

Office: **913-894-4500** | Mobile: 913-488-1117

Email: kdubbs@trinityconsultants.com

Learn about Trinity's courses for environmental professionals.

From: Hawkins, Andy [mailto:hawkins.andy@epa.gov]
Sent: Friday, September 25, 2015 9:27 AM
To: Tiffany M. Le; Lynn Deahl
Cc: Ingrid Setzler; Avey, Lance; Kasi Dubbs
Subject: RE: 1-Hour SO2 Modeling

Tiffany,

Sure sounds good. I guess the confusing part to me is the stack seems to be listed as a building structure in BPIP and is also listed in the stack portion, but not aligned with the other buildings correctly, if that makes any sense. I may be interpreting what has been done wrong so I just wanted Kasi to double check it. So I'm working away from the office today so email would work best today for me.

Thanks,

Andy

Andy Hawkins

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7179 office

hawkins.andy@epa.gov

From: Tiffany M. Le [mailto:tle@bpu.com]
Sent: Friday, September 25, 2015 9:08 AM
To: Hawkins, Andy <hawkins.andy@epa.gov>; Lynn Deahl <LDeahl@kdheks.gov>
Cc: Ingrid Setzler <isetzler@bpu.com>; Avey, Lance <Avey.Lance@epa.gov>; Kasi Dubbs (KDubbs@trinityconsultants.com) <KDubbs@trinityconsultants.com>
Subject: RE: 1-Hour SO2 Modeling

Hi Andy. Just wanted to let you know Kasi Dubbs with Trinity was out of the office yesterday, but is looking at your request today. Also, to make it more efficient in getting answers you need Kasi will email you directly and feel free to email her directly with modeling questions, and cc' myself, Ingrid and Lynn in all correspondence regarding this matter.

Thank you!

Tiffany M. Le

Sr. Environmental Scientist – Air Quality

Board of Public Utilities

4240 N 55th St.

Kansas City, KS 66104

Tel: (913) 573-9789

Fax: (913) 573-9774

From: Hawkins, Andy [mailto:hawkins.andy@epa.gov]
Sent: Thursday, September 24, 2015 8:31 AM

To: Tiffany M. Le; Lynn Deahl
Cc: Ingrid Setzler; Avey, Lance
Subject: RE: 1-Hour SO2 Modeling

Tiffany,

Can you please verify that the BPIP inputs you have provided are correct as something does not quite look correct when I map the structures and stack location(see second image). Structures and stack are mapped as UTM NAD83 Zone 15N using the BPIP file you provided EPA. The stack is the yellow dot. I would expect the stack to be centered with the structures based on aerial imagery. Also, what was the projection/zone used for the coordinates in your AERMOD runs?


Kansas City, KS - Google M
https://www.google.com/maps/place/Kansas+City,+KS/@39.1708148,-94.6973192,2
Kansas City, KS
Kansas City, KS
Photos · Search nearby
Map
Google
Imagery ©2015 DigitalGlobe,

Andy Hawkins

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7179 office

hawkins.andy@epa.gov

From: Tiffany M. Le [mailto:tle@bpu.com]
Sent: Wednesday, September 23, 2015 8:58 AM
To: Hawkins, Andy <hawkins.andy@epa.gov>; Lynn Deahl <LDeahl@kdheks.gov>
Cc: Ingrid Setzler <isetzler@bpu.com>; Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-Hour SO2 Modeling

Hi Andy,

Here is the file you requested.

Thanks!

Tiffany M. Le

Sr. Environmental Scientist – Air Quality

Board of Public Utilities

4240 N 55th St.

Kansas City, KS 66104

Tel: (913) 573-9789

Fax: (913) 573-9774

From: Hawkins, Andy [mailto:hawkins.andy@epa.gov]
Sent: Wednesday, September 23, 2015 8:17 AM
To: Lynn Deahl
Cc: Ingrid Setzler; Tiffany M. Le; Avey, Lance
Subject: RE: 1-Hour SO2 Modeling

Lynn, I need the Hourly emission rate file used in the modeling. It was not included in the modeling files submitted with this email. Looks like the file name is BPUN1~.HRL according to the input file you provided.

Andy Hawkins

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7179 office

hawkins.andy@epa.gov

From: Hawkins, Andy
Sent: Monday, September 21, 2015 9:42 AM
To: 'Lynn Deahl' <LDeahl@kdheks.gov>
Cc: 'Ingrid Setzler' <isetzler@bpu.com>; 'Tiffany M. Le' <tle@bpu.com>
Subject: RE: 1-Hour SO2 Modeling

I have the files… have not tried to open yet. I'll let you know if I can read them for some reason.

Thanks,

Andy

Andy Hawkins

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7179 office

hawkins.andy@epa.gov

From: Lynn Deahl [mailto:LDeahl@kdheks.gov]
Sent: Monday, September 21, 2015 9:34 AM
To: Hawkins, Andy <hawkins.andy@epa.gov>
Cc: 'Ingrid Setzler' <isetzler@bpu.com>; 'Tiffany M. Le' <tle@bpu.com>
Subject: FW: 1-Hour SO2 Modeling

Andy,

Would you please send a “reply to all” to confirm receipt?

Thanks,

-Lynn

From: Ingrid Setzler [mailto: **Ex. 6 - Personal Privacy**
Sent: Sunday, September 20, 2015 1:19 PM
To: Lynn Deahl <LDeahl@kdheks.gov>; Tom Gross <TGross@kdheks.gov>
Cc: tle@bpu.com
Subject: 1-Hour SO2 Modeling

All -

The files I attempted to resend for 1-hour SO_2 again failed so I am attempting once more via my personal email.

Please confirm receipt of all 8 files.

I am out of the office Monday for jury duty...and perhaps a few additional days for the same purpose this week. If you were unable to receive the files, please contact Tiffany and she can send via disc.

Thank you,

Ingrid Setzler

KCBPU

To: Hawkins, Andy[hawkins.andy@epa.gov]; Lynn Deahl[LDeahl@kdheks.gov]
Cc: Ingrid Setzler[isetzler@bpu.com]; Avey, Lance[Avey.Lance@epa.gov]; Kasi Dubbs (KDubbs@trinityconsultants.com)[KDubbs@trinityconsultants.com]
From: Tiffany M. Le
Sent: Fri 9/25/2015 2:08:28 PM
Subject: RE: 1-Hour SO2 Modeling

Hi Andy. Just wanted to let you know Kasi Dubbs with Trinity was out of the office yesterday, but is looking at your request today. Also, to make it more efficient in getting answers you need Kasi will email you directly and feel free to email her directly with modeling questions, and cc' myself, Ingrid and Lynn in all correspondence regarding this matter.

Thank you!

Tiffany M. Le

Sr. Environmental Scientist – Air Quality

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From: Hawkins, Andy [mailto:hawkins.andy@epa.gov]
Sent: Thursday, September 24, 2015 8:31 AM
To: Tiffany M. Le; Lynn Deahl
Cc: Ingrid Setzler; Avey, Lance
Subject: RE: 1-Hour SO2 Modeling

Tiffany,

Can you please verify that the BPIP inputs you have provided are correct as something does not quite look correct when I map the structures and stack location(see second image). Structures and stack are mapped as UTM NAD83 Zone 15N using the BPIP file you provided EPA. The stack is the yellow dot. I would expect the stack to be centered with the structures based on aerial imagery. Also, what was the projection/zone used for the coordinates in your AERMOD runs?

ED_001261_00010796

Andy Hawkins

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hawkins.andy@epa.gov

From: Tiffany M. Le [mailto:tle@bpu.com]
Sent: Wednesday, September 23, 2015 8:58 AM
To: Hawkins, Andy <hawkins.andy@epa.gov>; Lynn Deahl <LDeahl@kdheks.gov>
Cc: Ingrid Setzler <isetzler@bpu.com>; Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-Hour SO2 Modeling

Hi Andy,

Here is the file you requested.

Thanks!

Tiffany M. Le

Sr. Environmental Scientist – Air Quality

Board of Public Utilities

4240 N 55th St.

Kansas City, KS 66104

Tel: (913) 573-9789

Fax: (913) 573-9774

From: Hawkins, Andy [mailto:hawkins.andy@epa.gov]
Sent: Wednesday, September 23, 2015 8:17 AM
To: Lynn Deahl
Cc: Ingrid Setzler; Tiffany M. Le; Avey, Lance
Subject: RE: 1-Hour SO2 Modeling

Lynn, I need the Hourly emission rate file used in the modeling. It was not included in the modeling files submitted with this email. Looks like the file name is BPUN1~.HRL according to the input file you provided.

Andy Hawkins

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7179 office

hawkins.andy@epa.gov

From: Hawkins, Andy
Sent: Monday, September 21, 2015 9:42 AM
To: 'Lynn Deahl' <LDeahl@kdheks.gov>
Cc: 'Ingrid Setzler' <isetzler@bpu.com>; 'Tiffany M. Le' <tle@bpu.com>
Subject: RE: 1-Hour SO2 Modeling

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Thanks,

Andy

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From: Lynn Deahl [mailto:LDeahl@kdheks.gov]
Sent: Monday, September 21, 2015 9:34 AM
To: Hawkins, Andy <hawkins.andy@epa.gov>
Cc: 'Ingrid Setzler' <isetzler@bpu.com>; 'Tiffany M. Le' <tle@bpu.com>
Subject: FW: 1-Hour SO2 Modeling

Andy,

Would you please send a “reply to all” to confirm receipt?

Thanks,

-Lynn

From: Ingrid Setzler [mailto: Ex. 6 - Personal Privacy
Sent: Sunday, September 20, 2015 1:19 PM
To: Lynn Deahl <LDeahl@kdheks.gov>; Tom Gross <TGross@kdheks.gov>
Cc: tle@bpu.com
Subject: 1-Hour SO2 Modeling

All -

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Thank you,

Ingrid Setzler

KCBPU

To: Hawkins, Andy[hawkins.andy@epa.gov]; Lynn Deahl[LDeahl@kdheks.gov]
Cc: Ingrid Setzler[isetzler@bpu.com]; Avey, Lance[Avey.Lance@epa.gov]
From: Tiffany M. Le
Sent: Thur 9/24/2015 1:36:41 PM
Subject: RE: 1-Hour SO2 Modeling

Andy,

I am getting in touch with Trinity on this.

Thanks,

Tiffany M. Le

Sr. Environmental Scientist – Air Quality

Board of Public Utilities

4240 N 55th St.

Kansas City, KS 66104

Tel: (913) 573-9789

Fax: (913) 573-9774

From: Hawkins, Andy [mailto:hawkins.andy@epa.gov]
Sent: Thursday, September 24, 2015 8:31 AM
To: Tiffany M. Le; Lynn Deahl
Cc: Ingrid Setzler; Avey, Lance
Subject: RE: 1-Hour SO2 Modeling

Tiffany,

Can you please verify that the BPIP inputs you have provided are correct as something does not quite look correct when I map the structures and stack location(see second image). Structures and stack are mapped as UTM NAD83 Zone 15N using the BPIP file you provided EPA. The stack is the yellow dot. I would expect the stack to be centered with the structures based on aerial imagery. Also, what was the projection/zone used for the coordinates in your AERMOD runs?


Kansas City, KS - Google
https://www.google.com/maps/place/Kansas+City,+KS/@39.1708148,-94.6973192,2
Kansas City, KS
Kansas City, KS
Photos · Search nearby
Map
Google
Imagery ©2015 DigitalGlobe,

Andy Hawkins

EPA Region 7

11201 Renner Boulevard

Lenexa, Kansas 66219

(913) 551-7179 office

hawkins.andy@epa.gov

From: Tiffany M. Le [mailto:tle@bpu.com]
Sent: Wednesday, September 23, 2015 8:58 AM
To: Hawkins, Andy <hawkins.andy@epa.gov>; Lynn Deahl <LDeahl@kdheks.gov>
Cc: Ingrid Setzler <isetzler@bpu.com>; Avey, Lance <Avey.Lance@epa.gov>
Subject: RE: 1-Hour SO2 Modeling

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Tiffany M. Le

Sr. Environmental Scientist – Air Quality

Board of Public Utilities

4240 N 55th St.

Kansas City, KS 66104

Tel: (913) 573-9789

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Subject: FW: 1-Hour SO2 Modeling

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To: Lynn Deahl <LDeahl@kdheks.gov>; Tom Gross <TGross@kdheks.gov>
Cc: tle@bpu.com
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KCBPU

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Cc: Ingrid Setzler[isetzler@bpu.com]; Avey, Lance[Avey.Lance@epa.gov]
From: Tiffany M. Le
Sent: Wed 9/23/2015 1:58:23 PM
Subject: RE: 1-Hour SO2 Modeling
BPU N1.hrl

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Tiffany M. Le

Sr. Environmental Scientist – Air Quality

Board of Public Utilities

4240 N 55th St.

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Thank you,

Ingrid Setzler

KCBPU

From: Keith Head
Location: Conference Room #504
Importance: Normal
Subject: FW: Call with MS Power and EPA about SO2 Data Requirements Rule Modeling Protocol comments
Start Date/Time: Thur 8/18/2016 1:00:00 PM
End Date/Time: Thur 8/18/2016 2:00:00 PM

Lynorae and Scott,
See the scheduled August 18th conference call with MS and representatives from MS Power to discuss our July 18th comments on the modeling protocols for the two DRR sources (Plant Daniels and Red Hills).
Twunjala

-----Original Appointment-----
From: Keith Head [mailto:KHead@mdeq.ms.gov]
Sent: Monday, August 01, 2016 3:46 PM
To: Keith Head; Benvenutti, Keith M.; Walters, Justin T.; Bell, Tiereny; Pleas McNeel; Howard, Chris; Chad Lafontaine; Conference Room #504; Bradley, Twunjala; Rodney Cuevas; Smith, P. A. (Tony); Hicks, Travis N.; Gillam, Rick
Subject: Call with MS Power and EPA about SO2 Data Requirements Rule Modeling Protocol comments
When: Thursday, August 18, 2016 1:00 PM-2:00 PM (UTC) Monrovia, Reykjavik.
Where: Conference Room #504

Here is the call in information:

Conference Codes

To: Banister, Beverly[Banister.Beverly@epa.gov]; Davis, Scott[Davis.ScottR@epa.gov]; Worley, Gregg[Worley.Gregg@epa.gov]; Benjamin, Lynorae[benjamin.lynorae@epa.gov]; Rinck, Todd[Rinck.Todd@epa.gov]; Bradley, Twunjala[Bradley.Twunjala@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Howard, Chris[Howard.Chris@epa.gov]; Krivo, Stan[Krivo.Stanley@epa.gov]
Cc: Munsey, Elisabeth[Elisabeth.Munsey@dnr.ga.gov]; Tian, Di[Di.Tian@dnr.ga.gov]; Kim, Yunhee[Yunhee.Kim@dnr.ga.gov]; Hays, Karen[Karen.Hays@dnr.ga.gov]; Kuoh, Dika[Dika.Kuoh@dnr.ga.gov]
From: Boylan, James
Sent: Wed 12/14/2016 2:00:29 PM
Subject: RE: Savannah River Mill and Plant McIntosh Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO2 NAAQS
GAEPD_SRM_McIntosh_Modeling_Cover_Letter_Signed.pdf
GAEPD_SRM_Plant_McIntosh_12-13-2016.pdf

Beverly,

My original e-mail had three attachments. I am resending my e-mail below because one of the attachments may have been too large to send.

This e-mail includes two attachments:

(1) a copy of the cover letter from Ms. Karen Kays (EPD) to Ms. Beverly Banister (EPA), and

(2) a final modeling report created by EPD.

These two documents, the modeling report submitted by Georgia-Pacific to EPD, and a copy of all modeling inputs/output files on a DVD have been placed in the mail. Should you or your staff have any questions, please feel free to contact me at (404) 363-7014.

Sincerely,

Jim Boylan

From: Boylan, James
Sent: Tuesday, December 13, 2016 12:12 PM
To: 'Banister.Beverly@epa.gov'; 'davis.scottr@epa.gov'; 'Worley.Gregg@epa.gov';

benjamin.lynorae@epa.gov; 'rinck.todd@epa.gov'; Bradley, Twunjala (Bradley.Twunjala@epa.gov); Gillam, Rick (Gillam.Rick@epa.gov); 'Howard.Chris@epa.gov'; 'Krivo.Stanley@epa.gov'
Cc: Munsey, Elisabeth; Tian, Di; Kim, Yunhee; Hays, Karen; Kuoh, Dika
Subject: Savannah River Mill and Plant McIntosh Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO2 NAAQS

Dear Ms. Banister,

On June 8, 2016, the Georgia Environmental Protection Division (EPD) submitted a letter to EPA describing the approach that will be used to characterize air quality at sources in Georgia that had annual actual SO_2 emissions exceeding 2,000 tons per year (tpy) in 2014. In that letter, EPD stated that Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh would be characterized with air quality modeling. A modeling protocol was submitted to EPA on June 15, 2016. This submittal contains 2012-2014 modeling that can be used for SO_2 designation recommendations.

A total of three (3) attachments are included:

(1) a copy of the cover letter from Ms. Karen Kays (EPD) to Ms. Beverly Banister (EPA),

(2) a final modeling report created by EPD, and

(3) a modeling report submitted by Georgia-Pacific to EPD.

A hard copy of these three documents along with a copy of all modeling inputs/output files on a DVD have been placed in the mail. Should you or your staff have any questions, please feel free to contact me at (404) 363-7014.

Sincerely,

Jim Boylan

James W. Boylan, Ph.D.

Manager, Planning & Support Program

Georgia Department of Natural Resources

Environmental Protection Division - Air Protection Branch

4244 International Parkway, Suite 120

Atlanta, GA 30354

Office: 404-363-7014   Fax: 404-363-7100

E-mail: James.Boylan@dnr.ga.gov

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404-363-7000

December 13, 2016

Ms. Beverly Banister, Director
Air, Pesticides and Toxics Management Division
U.S. EPA, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303-8909

RE: Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO_2 NAAQS

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Should you or your staff have any questions or comments, please feel free to contact Jim Boylan at James.Boylan@dnr.ga.gov or 404-363-7014.

Sincerely,

Karen Hays

Karen D. Hays, P.E.
Chief, Air Protection Branch
Georgia Environmental Protection Division

c: Scott Davis (Davis.ScottR@epa.gov), EPA Region 4
Gregg Worley (Worley.Gregg@epa.gov), EPA Region 4
Lynorae Benjamin (Benjamin.Lynorae@epa.gov), EPA Region 4
Todd Rinck (Rinck.Todd@epa.gov), EPA Region 4

Attachments

GA EPD Dispersion Modeling for the 2010 1-Hour SO_2 NAAQS: Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh December 13, 2016

Georgia-Pacific Savannah River Mill (SRM) and Georgia Power Plant McIntosh are affected sources under EPA's Data Requirements Rule (DRR) because Savannah River Mill and Plant McIntosh each emitted greater than 2,000 tons of SO_2 in 2014. To satisfy the requirements of the DRR, Georgia-Pacific and Georgia Power notified Georgia EPD that they will characterize air quality through the modeling option and submitted a dispersion modeling report and related modeling files (prepared by Georgia Pacific) on November 11, 2016. Georgia EPD reviewed the modeling report and files to ensure that the dispersion modeling was conducted in accordance with the final Data Requirements Rule and Modeling Technical Assistance Document (TAD).

This report discusses the procedures used to review the supporting dispersion modeling and the modeling results.

INPUT DATA

Meteorological Data – Since no on-site meteorological data was available, the hourly meteorological data of surface and upper air observations from the Savannah/Hilton Head International Airport located in Savannah, GA (surface) and the Charleston International Airport, SC (upper) NWS stations for the period of 2012-2014 were used in this modeling. The data were compiled and provided by GA EPD. The AERMET processor (15181) was used to convert the NWS data into AERMOD model-ready meteorological data files using the AERSURFACE surface characteristics evaluation utility (13016). Values of the surface characteristics (albedo, Bowen ratio, and surface roughness) surrounding the Savannah Airport, GA NWS surface station and the project site were derived for each of twelve 30-degree sectors over four seasons in accordance with the AERMOD Implementation Guide (09078). GA EPD compared the above AERSURFACE generated surface characteristics and found no significant differences in the albedo, Bowen ratio, and surface roughness for the two sites. Therefore, a meteorological dataset with the Savannah airport NWS surface characteristics was used in the modeling. According to the 3-year wind rose for the Savannah International Airport (Figure 1), the winds are predominantly from the southwest.

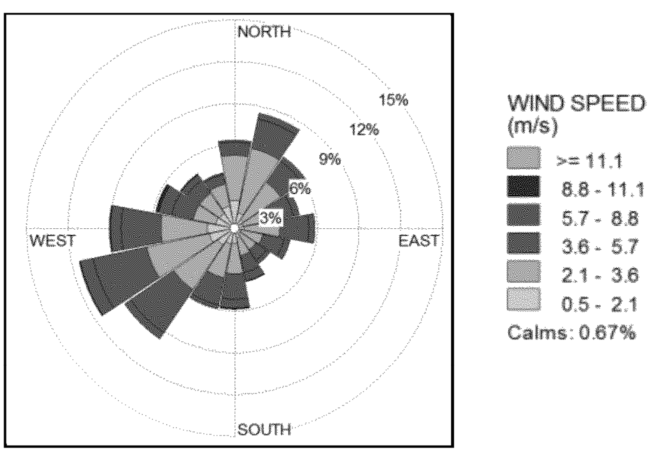

Figure 1. Three-year Wind Rose (2012-2014) for the Savannah International Airport.

Source Data – Georgia-Pacific's Savannah River Mill operates a recycle and deinking paper mill. The primary operations at the Savannah River Mill are pulping and bleaching operations, paper machines, converting and printing operations, and additional equipment necessary to support these operations including three boilers (BO01 -Boiler No.3, BO02 -Boiler No.4, and BO03-Boiler No.5). Each boiler is equipped with a baghouse to control particulate matter (PM) emissions and a limestone injection system to control SO_2 emissions. Each boiler (BO01-BO03) exhausts to a dedicated 381-ft stack with an inner diameter of 7.25 ft. Actual hourly emissions, temperatures, and flow rates for the most recent three calendar years (2012 -2014) were modeled. Hourly emission rates, temperatures, and flow rates were reported to EPA's Clean Air Markets Division (CAMD) under the Acid Rain Program using continuous emission monitoring systems (CEMS) certified according to 40 CFR Part 75 . Figures 2-4 show the hourly SO_2 emission rates (g/s) that were modeled through each stack for BO01-BO03 in 2012, 2013, and 2014.

Plant McIntosh is located adjacent to Savannah River Mill, and is an electric power generation plant including one steam electric generating unit (SG01) that primarily burns coal and eight simple cycle combustion turbines (CT1-CT8) that primarily burn natural gas. The McIntosh Combined-Cycle facility is also located nearby and includes two combined-cycle power blocks. Each combined-cycle power block includes two combustion turbines (10A-B & 11A-B) with a supplementally fired heat recovery steam generator (dust burner). Each dust burner fires natural gas exclusively. The steam generating unit SG01 exhausts through one 400-ft stack, and each simple cycle combustion turbine has its own 64-ft stack. The emissions from each combined cycle combustion turbines exhausts through a 160-ft stack. The actual hourly emissions, temperatures, and flow rates for steam electric generating unit (SG01) were modeled. Hourly emission and flow rates were reported to EPA's Clean Air Markets Division (CAMD) under the Acid Rain Program using CEMS certified according to 40 CFR Part 75. Figure 5 shows the hourly SO_2 emissions rates for SG01 that were modeled in 2012, 2013, and 2014. The SO_2 emissions for the simple cycle combustion turbines (CT1-CT8) were based on 15 ppm ULSD combustion (1.93 lb/hr) and the combined cycle combustion turbines (10A-B and 11A-B) were based on an emission rate of 0.0006 lb/MMBtu, including the heat input from the duct burners (1.47 lb/hr).

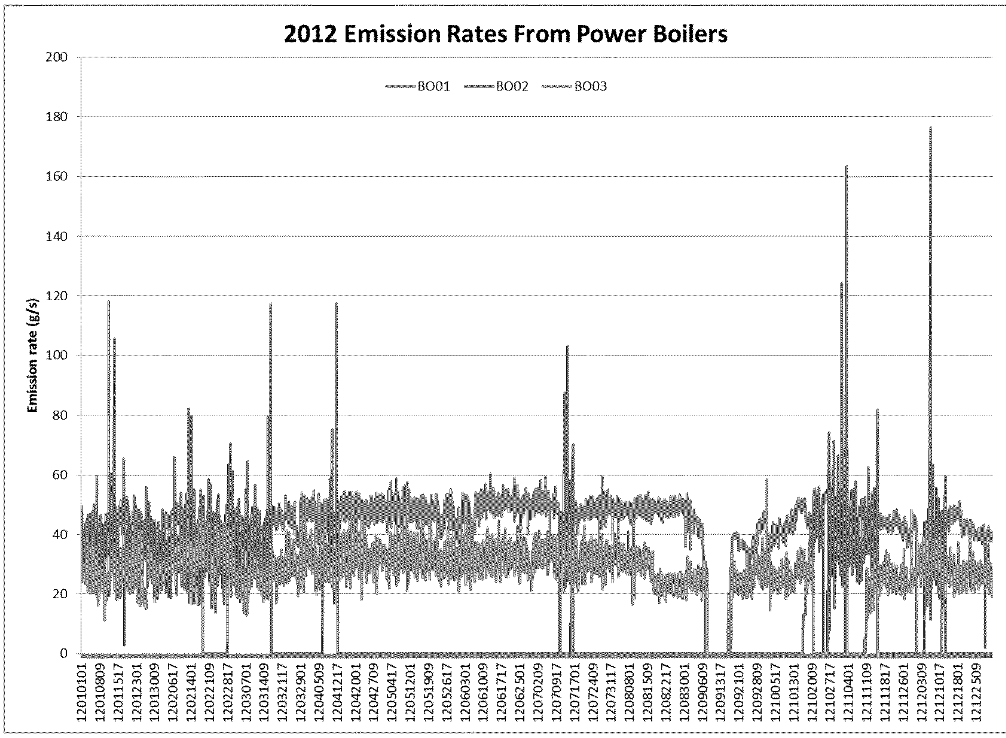

Figure 2 . Hourly (2012) SO $_2$ emission rates (g/s) modeled through each stack for Georgia - Pacific Savannah River Mill.

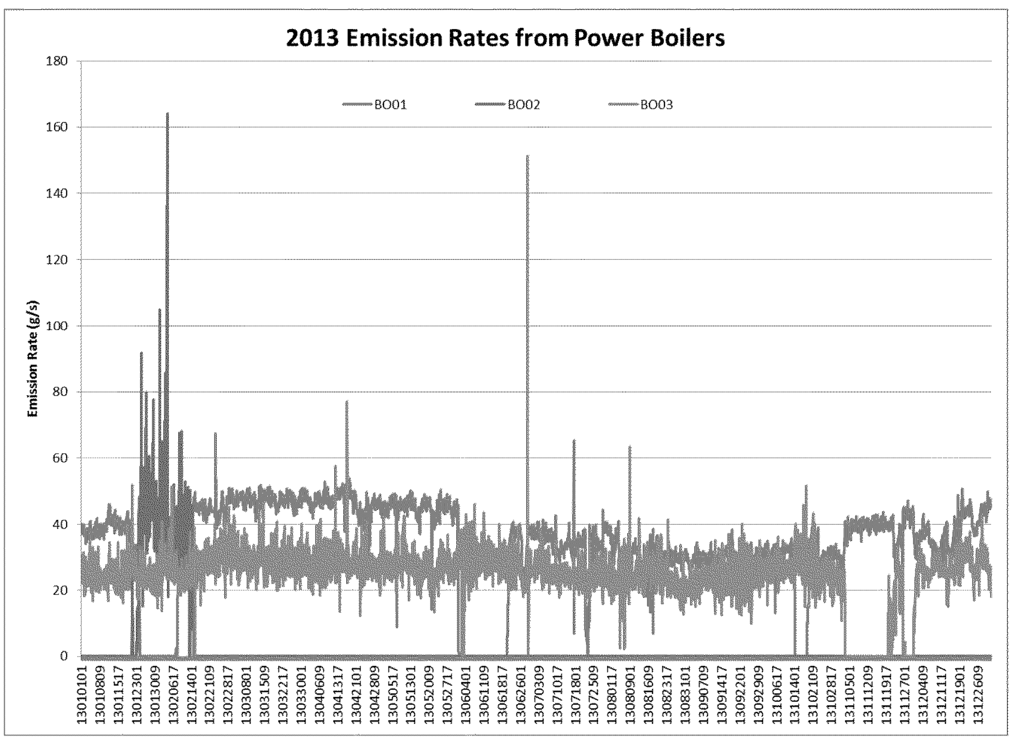

Figure 3. Hourly (2013) SO $_2$ emission rates (g/s) modeled through each stack for Georgia - Pacific Savannah River Mill.

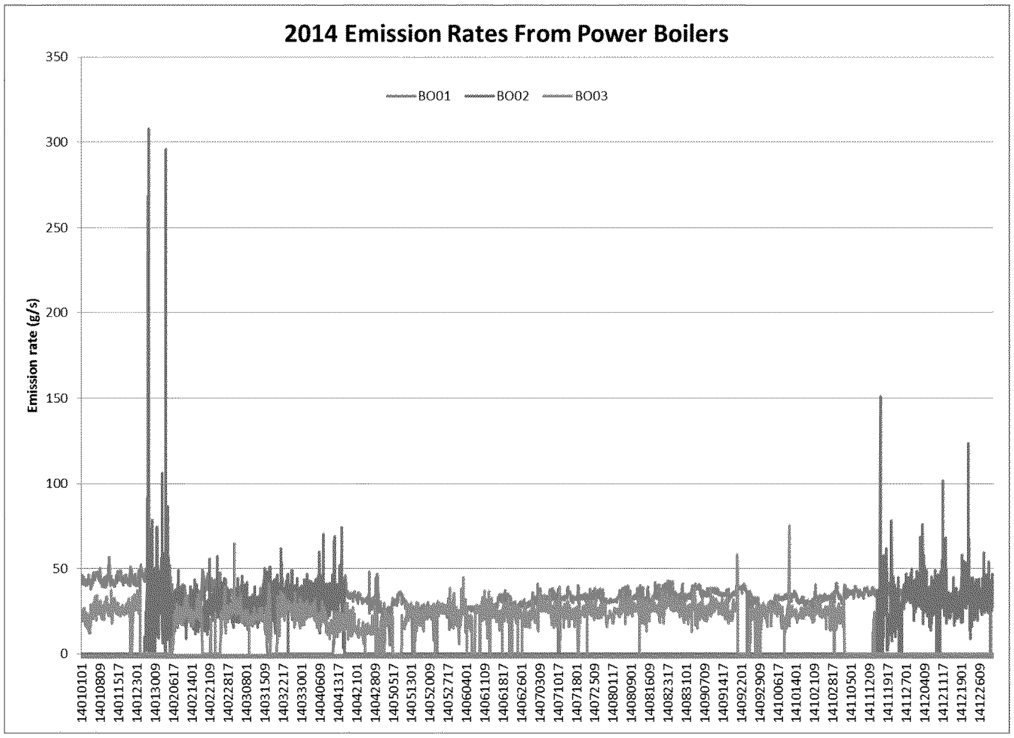

Figure 4. Hourly (2014) SO_2 emission rates (g/s) modeled through each stack for Georgia-Pacific Savannah River Mill.

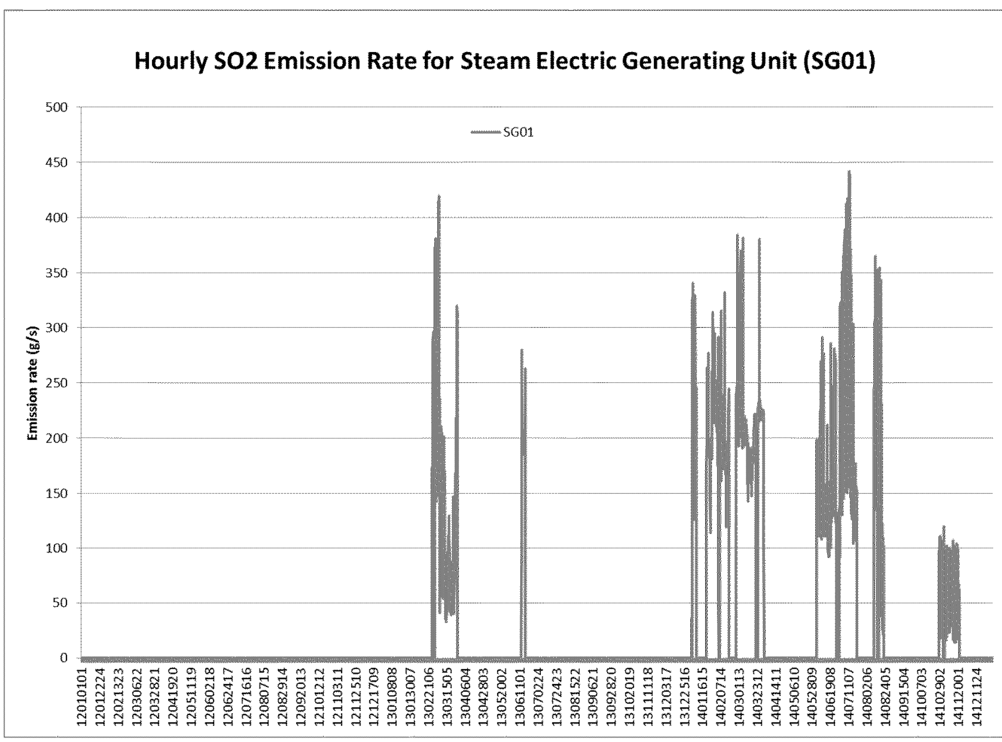

Figure 5. Hourly (2012-2014) SO_2 emission rates (g/s) that were modeled for SG01 for Plant McIntosh.

Receptor Locations – A comprehensive Cartesian receptor grid extending to approximately 20 km from the Savannah River Mill was used in the AERMOD modeling analysis to assess ground-level SO_2 concentrations. The Cartesian receptors were placed according to the following configuration based on the center of the Savannah River Mill:

- 0 km – 5km → 100 meters apart
- 5 km – 10 km → 500 meters apart
- 10 km – 20 km → 1,000 meters apart

This domain is sufficient to capture the maximum impact which was located at a receptor spaced at 100 meters. Receptors were also placed at 100-m intervals within Savannah River Mill, Plant McIntosh, Effingham County Power, LLC, and Jasper Generating facility ambient air boundary. Although the SO_2 Modeling TAD specifies that receptors need not be placed at locations where it is not feasible to place a monitor (e.g., water bodies and within facility property lines), the receptor grid conservatively simulates all areas including within each facility's ambient air boundary that is not generally accessible to the public. This receptor grid represents a very conservative approach to the modeling analysis. **Since the maximum SO_2 impacts are nearby the Savannah River Mill, we decided to focus our analysis on a 10 km modeling sub-domain extending to 10 km from the Savannah River Mill (includes all receptors at 100 meters and 500 meters spacing).** All receptor locations are represented in the Universal Transverse Mercator projections, Zone 17, North American Datum 1983.

Terrain Elevation – Terrain data from USGS 1-sec National Elevation Dataset (NED) CONUS were extracted to obtain the elevations of all sources and receptors by AERMAP terrain processor (version 11103). The resulting elevation data were verified by comparing contoured receptor elevations with USGS 7.5-minute topographic map contours.

Building Downwash – The effects of building downwash were incorporated into the AERMOD analysis. Direction-specific building parameters required by AERMOD were developed using the BPIP PRIME utility (version 04274). Actual stack heights for Savannah River Mill and Plant McIntosh were used in the modeling together with actual emissions.

Offsite Emission Inventory – Figure 6 contains a spatial map of annual 2014 SO_2 emissions (TPY) from offsite sources near Savannah River Mill. Table 1 contains a detailed list of facilities within 50 km from Savannah River Mill and the emission (TPY), distance (km), and Q/d. Two electric generating power plants (Effingham County Power, LLC in Georgia and Jasper Generating Station in South Carolina) are within 10 km of Savannah River Mill and Plant McIntosh. These facilities were modeled with their potential hourly SO_2 emission rates.

International Paper - Savannah (IP-Savannah) is over 25 km away and was modeled separately as part of the DRR requirements. This modeling was submitted to EPA on August 30, 2016. The impact from IP-Savannah is accounted for using the maximum modeled SO_2 concentration of 50.3 $\mu g/m^3$ (19.2 ppb) due to IP-Savannah (without background concentration added) along the northern and upper western modeling domain boundaries. This is a very conservative assumption since the SO_2 concentrations will continue to decrease at further distances. Detailed information can be found in the Appendix A.

The impacts from Georgia Power Plant Kraft , Weyerhaeuser NR Port Wentworth, and Imperial - Savannah, L.P. with Q/d values greater than 20 were included in the seasonal background concentration. These facilities are located approximately 7 km away from the Augusta & Lathrop SO_2 monitor, but are loca ted approximately 20 km away from the Savannah River Mill and Plant McIntosh. These same facilities are approximately 10 km away from the edge of the 10 km modeling sub-domain used for our modeling analysis. Therefore, th e use of the 2012 -2014 seasonal hour of day background SO_2 concentrations will be a conservative estimate of the background (not including IP-Savannah) since the Plant McIntosh and Georgia Pacific Savannah River Mill modeling domain is further away from Weyerhaeuser NR Port Wentworth, Im perial-Savannah, L.P., and Georgia Power Plant Kraft than the Augusta & Lathrop SO_2 monitor.

All the remaining facilities have Q/d values less than 20 and were not explicitly modeled.

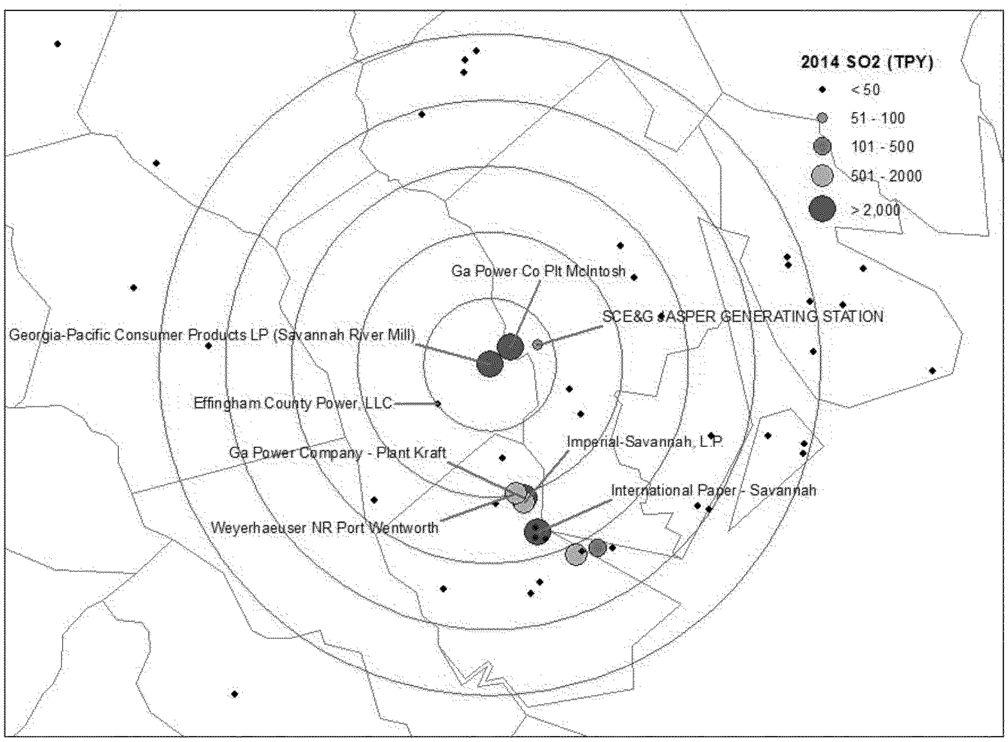

Figure 6. Map of actual annual 2014 SO_2 emissions (TPY) from offsite sources near the Georgia-Pacific Savannah River Mill facility. Red circles are placed in 10 km increments out to 50 km.

Table 1. List of facilities within 50 km from the Georgia-Pacific Savannah River Mill facility and the emission (TPY)/distance (km), or Q/d.

FACILITY ID	FACILITY NAME	SO_2 Emissions (TPY)	distance (km)	Q/d
10300003	Ga Power Co Plant McIntosh	2267.8	4.1	549
5100007	International Paper - Savannah	8122.7	26.3	309
5100006	Ga Power Company - Plant Kraft	5140.1	20.9	245
5100010	Weyerhaeuser NR Port Wentworth	570.3	19.9	29
5100110	Imperial-Savannah, L.P.	582.0	21.5	27
5100077	Southern States Phosphate & Fertilizer	597.1	31.6	19
13005611	SCE&G JASPER GENERATING STATION	98.6	7.9	12
10300014	Ga Power Company - McIntosh Combined Cycle Facility	15.9	2.5	6
5100008	Savannah Acid Plant LLC	125.2	32.2	4
5100148	Arizona Chemical Corporation	34.7	27.1	1
5100205	Superior Landfill & Recycling Center	42.6	34.6	1
10300012	Effingham County Power, LLC	3.2	9.8	0
5100037	EMD Millipore Corporation	4.5	14.4	0
8306411	SANTEE COOPER HILTON HEAD	14.4	49.3	0
5100076	Colonial Terminals, Inc.	6.4	27.7	0
4781011	USMC RECRUIT DEPOT	9.9	49.0	0
4802311	ELLIOTT SAWMILLING	7.4	44.3	0
10300004	Simpson Lumber Company, LLC	2.0	26.9	0
3100028	Claude Howard Lumber Company, Inc.	3.6	55.1	0
3100005	W. M. Sheppard Lumber Co Inc,	2.4	42.6	0
4508411	HICKORY HILL LANDFILL/RECYCLING	1.5	27.0	0
9186311	Hilton Head Airport	1.3	49.0	0
5100149	Hunter Army Airfield	0.4	35.1	0
9159411	Ridgeland	0.2	26.6	0
5100019	Georgia-Pacific Gypsum Llc - Savannah Plant	0.1	31.5	0
17012111	HAIG POINT CLUB	0.1	39.8	0
5100046	Gulfstream Aerospace Corporation	0.1	21.1	0
5100012	Axeon Specialty Products	0.1	25.6	0
5100003	Southern LNG Company, L.L.C. -Elba Island LNG	0.0	33.4	0
4834011	US MARINE CORPS AIR STATION	0.0	47.5	0
5100017	Ga Power Company - Plant Boulevard	0.0	33.7	0
16906311	COASTAL DEBRIS	0.0	25.5	0
4508311	SCE&G HARDEEVILLE	0.0	12.6	0
12084911	BEAUFORT COUNTY MEMORIAL HOSPITAL	0.0	49.3	0
11099511	MELROSE LANDING	0.0	38.0	0
16083011	SALTY FARE LANDNG	0.0	43.5	0
4760611	VALMONT COMPOSITE STRUCTURES ESTILL	0.0	46.1	0
9159511	ATHENA CORPORATION	0.0	15.7	0
11426511	DAVIS	0.0	39.1	0
10942511	HARPERS	0.0	47.4	0
12486811	BEAUFORT MCAS /MERRITT FIELD/	0.0	47.8	0

1-HOUR SO_2 NAAQS ASSESSMENT

The total SO_2 concentrations were calculated as the sum of the modeled concentrations due to emissions from Savannah River Mill, Plant McIntosh, Effingham County Power, and Jasper Generating Station; the 2012-2014 seasonal hour of day background SO_2 concentration; and the modeled impact from IP-Savannah (50.3 $\mu g/m^3$, 19.2 ppb). AERMOD (version 15181) was used to model the 1st, 2nd, 3rd, and 4th highest three-year average of maximum 1-hour SO_2 concentrations due to emissions from those four facilities (Table 2). Detailed information on the 2012-2014 seasonal hour of day background SO_2 concentrations and modeled impact from IP-Savannah is included in Appendix A. Figure 7 shows a google earth map for the Savannah River Mill, Plant McIntosh, Effingham County Power, and Jasper Generating Station. As seen in Figure 8, the 4th high daily maximum 1-hour SO_2 concentration averaged over 3-years was located at approximately 0.86 kilometers south east of the center of the Savannah River Mill.

The 4th highest 1-hour SO_2 concentration averaged over three years including the 2012-2014 seasonal hour of day background SO_2 concentration and the modeled impact from IP-Savannah is 187.5 $\mu g/m^3$ (72 ppb). As shown in Table 3, this value is below the NAAQS level of 196 $\mu g/m^3$ (75 ppb).

Table 2. Summary of highest 1-hour SO_2 modeled impacts averaged over 3 model years.

Rank	**3-year Average (ppb)**	2012 (ppb)	2013 (ppb)	2014 (ppb)	Receptor (lat, log)	Distance from center of SRM (km)
1st High	**77**	86	56	88	32.3352, -81.1915	1.04
2nd High	**58**	45	59	70	32.3271, -81.1915	1.04
3rd High	**54**	46	54	62	32.3280, -81.1915	0.99
4th High	52	47	54	56	32.3271, -81.1936	0.86

Table 3. Summary of 1-hour SO_2 NAAQS ($\mu g/m^3$) analysis

Pollutant	Averaged Period	Model Design Concentration including seasonal background ($\mu g/m^3$)	IP Savannah Background Concentration ($\mu g/m^3$)	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Below NAAQS (Y/N)
SO_2	1-hour	137.2	50.3	187.5	196	Y

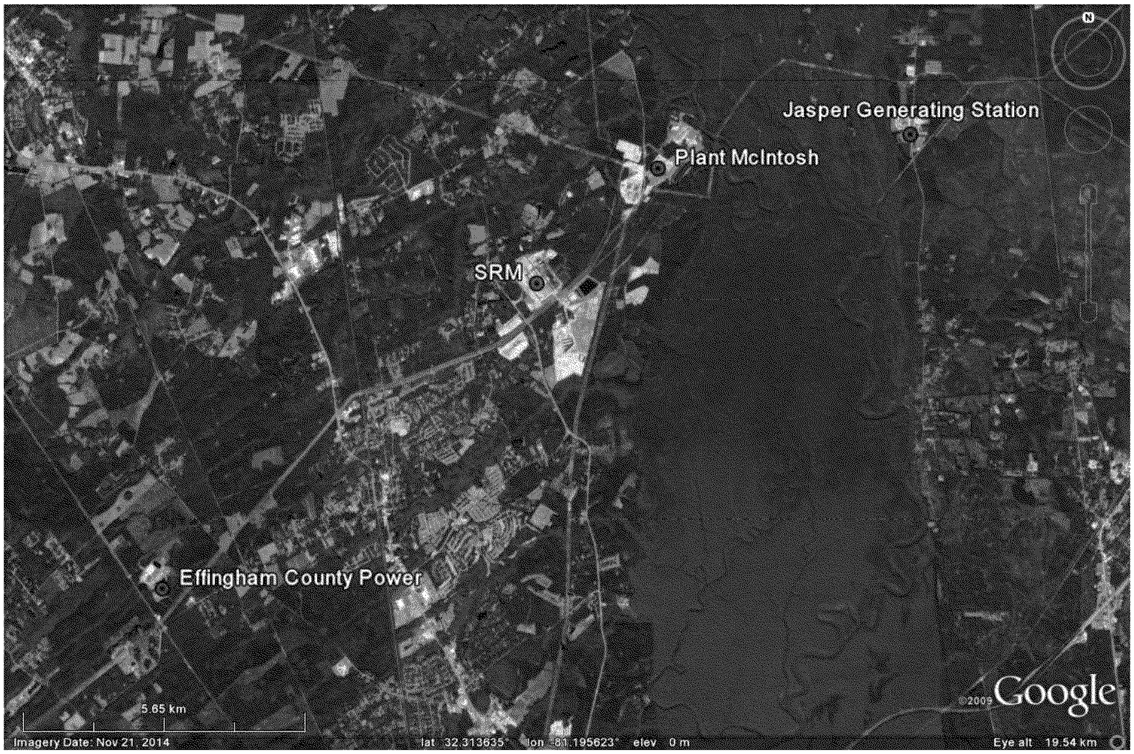

Figure 7. Google Earth Map for Savannah River Mill, Plant McIntosh, Effingham County Power, and Jasper Generating Station.

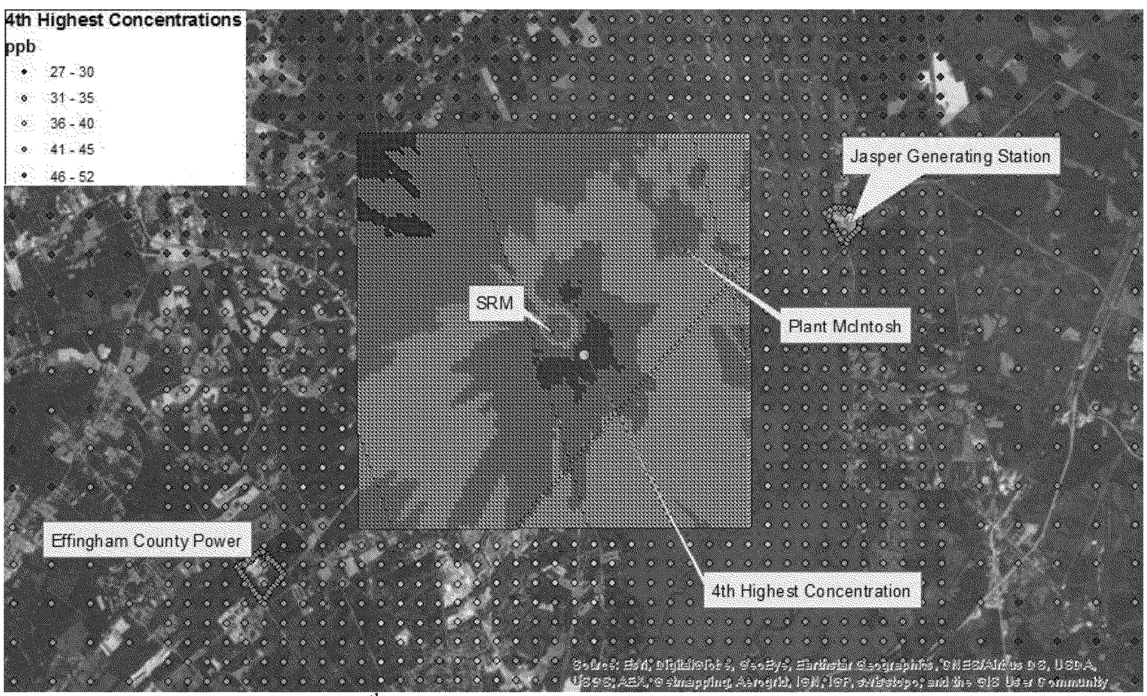

Figure 8. Spatial plot of the 4[th] highest daily maximum 1-hour SO_2 concentration averaged over 3 years.

CONCLUSIONS

The Savannah River Mill and Plant McIntosh dispersion modeling for the 1-hour SO_2 NAAQS designations was conducted in accordance with the final Data Requirements Rule (DRR) and Modeling Technical Assistance Document (TAD) using the most recently available information. As seen in Table 3, SO_2 emissions from Savannah River Mill and Plant McIntosh do not cause or contribute to any violations of the 1-hour SO_2 NAAQS. This result demonstrates attainment of the 1-hour SO_2 NAAQS in the area surrounding the Savannah River Mill and Plant McIntosh.

Appendix A

Background to Account for Offsite Emission Sources Near Georgia Pacific Savannah River Mill and Georgia Power Plant McIntosh

EPA requested that International Paper Savannah (IP-Savannah), Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft be included in the modeling. Since IP-Savannah modeling has already been submitted to EPA to fulfill DRR modeling requirements, we proposed to use this existing modeling to help develop background concentrations for the requested sources.

To account for the impacts from IP-Savannah, we are proposing to use the maximum modeled SO_2 concentration from IP-Savannah (without background added) along the northern and upper western modeling domain boundary (see Figure A-1 and attached Excel file). Based on this analysis, the maximum SO_2 concentration along the northern and upper western modeling domain boundary is 19.2 ppb. Using this value to represent the impacts from IP-Savannah in the Plant McIntosh/Georgia Pacific Savannah River Mill 10 km modeling sub-domain will be a very conservative assumption since the SO_2 concentrations will continue to decrease at further distances.

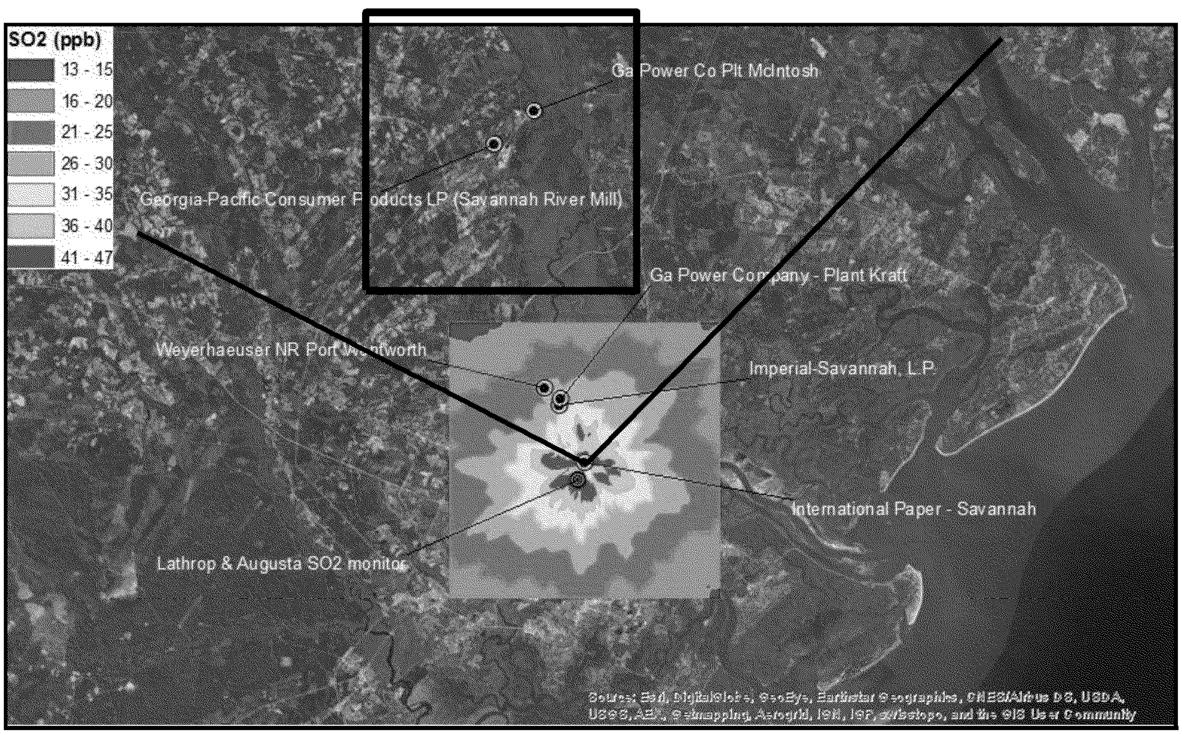

Figure A-1. Modeling domain for IP-Savannah and 10 km modeling sub-domain for Plant McIntosh and Georgia Pacific Savannah River Mill.

As part of the IP-Savannah modeling, Georgia EPD developed seasonal hour of day background SO_2 concentrations. These background values are meant to include impacts from all large sources in Savannah except IP-Savannah (e.g., Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft, plus other nearby sources) surrounding the Lathrop & Augusta SO_2 monitor (13-051-1002). The seasonal hour of day background concentrations were calculated for each of the four seasons using the following steps:

1. For each of the three years of data, SO_2 data was sorted by wind direction.
2. All SO_2 values corresponding to a wind direction between 10° and 45° were ignored since those impacts were directly attributable to IP-Savannah.
3. For each year, the remaining SO_2 data was sorted by season; spring (March -May), summer (June-August), fall (September- November), and winter (December-February).
4. For each season, SO_2 data was sorted by hour of day.
5. For each year and season, the second highest SO_2 value was selected for each hour of the day.
6. The average over the three years of the second highest SO_2 value was calculated for each hour of the day for each season.

For the IP-Savannah DRR modeling, 2011-2013 SO_2 data was used to develop the seasonal hour of day SO_2 background concentrations. However, for this modeling we are proposing to use 2012-2014 SO_2 data to develop the seasonal hour of day SO_2 background concentrations to be consistent with the actual emissions and meteorology used in the Plant McIntosh/Georg ia Pacific Savannah River Mill modeling. Table A-1 and Figure A-2 show the seasonal hour of day SO_2 background concentrations that we propose to use in this modeling. The detailed calculations are included in the attached Excel file.

Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft are located approximately 7 km away from the Augusta & Lathrop SO_2 monitor. These same facilities are located approximately 20 km away from Plant McIntosh and Georgia Pacific Savannah River Mill and approximately 10 km away from the edge of the Plant McIntosh and Georgia Pacific Savannah River Mill 10 km modeling sub-domain. Therefore, the use of the 2012-2014 seasonal hour of day background SO_2 concentrations will be a conservative estimate of the background (not including IP-Savannah) since the Plant McIntosh and Georgia Pacific Savannah River Mill 10 km modeling sub-domain it is further away from Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft than the Augusta & Lathrop SO_2 monitor.

By adding 19.2 ppb from IP-Savannah to the 2012-2014 seasonal hour of day background SO_2 concentrations described above, the impacts from IP-Savannah, Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft will be conservatively accounted for in the combined seasonal hour of day SO_2 background concentration. This combined seasonal hour of day SO_2 background concentration will be added to the modeled design concentration for the sources that were explicitly modeled in the Plant McIntosh/Georgia Pacific Savannah River Mill modeling domain and compared to the NAAQS.

Table A-1. Seasonal hour of day background SO_2 concentration in Savannah (not including IP-Savannah) for 2012-2014.

Hour of Day	Winter	Spring	Summer	Fall
1	12.0	4.5	3.6	6.5
2	12.0	4.9	3.7	6.3
3	19.0	4.5	4.7	7.7
4	11.0	4.4	4.4	12.3
5	9.6	7.1	5.0	8.6
6	7.6	7.5	5.2	10.4
7	8.3	6.6	8.0	15.4
8	10.2	7.3	13.4	13.8
9	13.4	14.5	9.0	18.2
10	20.0	18.1	21.1	24.1
11	19.0	20.3	14.9	22.8
12	26.9	24.9	14.1	21.0
13	22.5	12.8	11.9	19.8
14	18.7	17.2	11.0	17.2
15	24.6	12.5	15.8	17.7
16	20.5	8.1	5.2	9.0
17	10.2	6.3	5.9	11.7
18	8.8	5.9	5.6	7.1
19	11.0	5.9	4.5	6.7
20	6.9	5.9	4.5	5.6
21	7.0	6.8	5.2	7.9
22	6.8	5.5	4.6	9.9
23	7.7	6.3	3.6	7.3
24	11.6	6.4	3.6	11.7

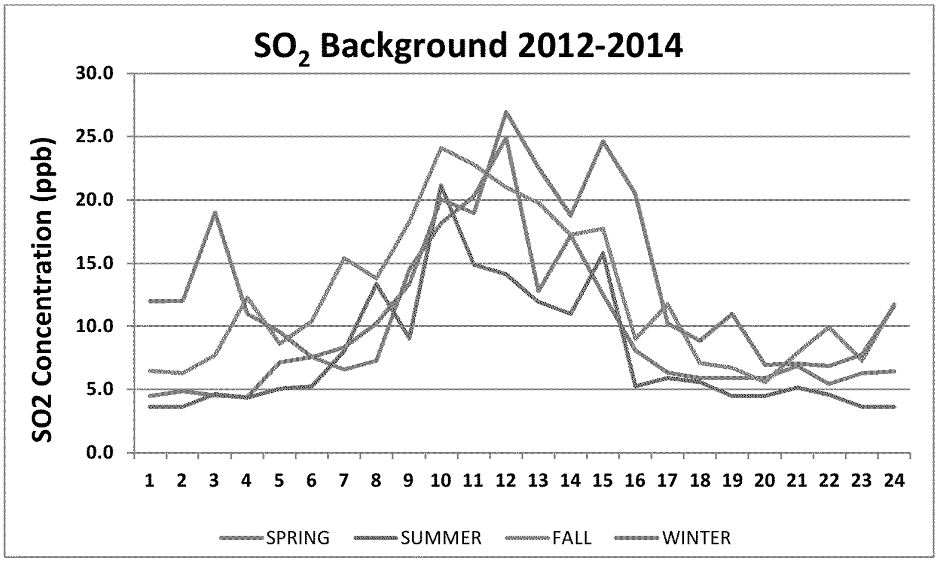

Figure A-2. Seasonal hour of day SO_2 background concentration in Savannah (not including IP-Savannah) for 2012-2014.

To: Banister, Beverly[Banister.Beverly@epa.gov]; Davis, Scott[Davis.ScottR@epa.gov]; Worley, Gregg[Worley.Gregg@epa.gov]; Benjamin, Lynorae[benjamin.lynorae@epa.gov]; Rinck, Todd[Rinck.Todd@epa.gov]; Bradley, Twunjala[Bradley.Twunjala@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Howard, Chris[Howard.Chris@epa.gov]; Krivo, Stan[Krivo.Stanley@epa.gov]
Cc: Munsey, Elisabeth[Elisabeth.Munsey@dnr.ga.gov]; Tian, Di[Di.Tian@dnr.ga.gov]; Kim, Yunhee[Yunhee.Kim@dnr.ga.gov]; Hays, Karen[Karen.Hays@dnr.ga.gov]; Kuoh, Dika[Dika.Kuoh@dnr.ga.gov]
From: Boylan, James
Sent: Tue 12/13/2016 5:13:25 PM
Subject: Savannah River Mill and Plant McIntosh Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO2 NAAQS
GAEPD_SRM_McIntosh_Modeling_Cover_Letter_Signed.pdf
GAEPD_SRM_Plant_McIntosh_12-13-2016.pdf
GP SRM and Plant McIntosh Modeling Report (2016-11-10)_Final.pdf

Dear Ms. Banister,

On June 8, 2016, the Georgia Environmental Protection Division (EPD) submitted a letter to EPA describing the approach that will be used to characterize air quality at sources in Georgia that had annual actual SO_2 emissions exceeding 2,000 tons per year (tpy) in 2014. In that letter, EPD stated that Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh would be characterized with air quality modeling. A modeling protocol was submitted to EPA on June 15, 2016. This submittal contains 2012-2014 modeling that can be used for SO_2 designation recommendations.

A total of three (3) attachments are included:

(1) a copy of the cover letter from Ms. Karen Kays (EPD) to Ms. Beverly Banister (EPA),

(2) a final modeling report created by EPD, and

(3) a modeling report submitted by Georgia-Pacific to EPD.

A hard copy of these three documents along with a copy of all modeling inputs/output files on a DVD have been placed in the mail. Should you or your staff have any questions, please feel free to contact me at (404) 363-7014.

Sincerely,

Jim Boylan

James W. Boylan, Ph.D.

Manager, Planning & Support Program

Georgia Department of Natural Resources

Environmental Protection Division - Air Protection Branch

4244 International Parkway, Suite 120

Atlanta, GA 30354

Office: 404-363-7014   Fax: 404-363-7100

E-mail: James.Boylan@dnr.ga.gov

Georgia-Pacific

Georgia-Pacific Consumer Products LP
Savannah River Mill
437 Old Augusta Road South
Rincon, GA 31326

November 9, 2016

Dr. James Boylan
Manager, Planning & Support Program
Georgia Environmental Protection Division
Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, GA 30354

RE: Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary NAAQS
Air Quality Modeling Report for Effingham County
Georgia-Pacific Consumer Products LP – Savannah River Mill (AIRS ID: 10300007)
Georgia Power Company – Plant McIntosh (AIRS ID: 10300003)

Dear Dr. Boylan:

EPA's Data Requirements Rule (DRR) for the 2010 1-Hour Sulfur Dioxide (SO_2) National Ambient Air Quality Standards (NAAQS) (40 CFR Part 51, Subpart BB) requires that state air quality regulatory agencies characterize air quality in the areas surrounding certain sources of SO_2 emissions. In a letter dated January 14, 2016 to EPA Region 4, the Georgia Environmental Protection Division (EPD) identified the Georgia-Pacific Consumer Products LP (GP) Savannah River Mill (SRM) and Georgia Power Company Plant McIntosh as sources for which SO_2 air quality must be characterized under the DRR. In response to Georgia EPD's request dated February 12, 2016, SRM and Plant McIntosh notified Georgia EPD that the facilities have selected the air quality modeling option using three years (2012-2014) of actual SO_2 emissions to characterize air quality relative to the 2010 1-hour SO2 NAAQS on March 30, 2016.

Georgia-Pacific and Georgia Power are providing the enclosed air quality modeling report consistent with the dispersion modeling protocol submitted to the Georgia EPD and with the addendum to the modeling protocol prepared by the Georgia EPD and submitted to the EPA on June 17, 2016. EPA provided comments on the modeling protocol on August 18, 2016. The Georgia EPD resubmitted a revised addendum to for the modeling protocol to the EPA on October 18, 2016 addressing EPA's comments on the background concentration to be used in the modeling analysis. EPA approved the revised addendum to the modeling protocol on October 28, 2016. A copy of the modeling protocol and the addendum documentation are contained in Appendix A of the report. The results of the analyses described in the report demonstrate attainment of the 1-hour SO2 NAAQS in the area surrounding the SRM and Plant McIntosh.

Please contact Mr. Pavankumar Sonwane of GP at pavankumar.sonwane@gapac.com or 404-652-4709 or to discuss questions and comments about this air quality modeling protocol.

Sincerely,

Robert A. Shaw
Vice President of Operations-Savannah River Mill

Enclosures

cc: Dr. Maria Zufall (Georgia-Pacific, Atlanta)
Mr. Pavankumar Sonwane (Georgia-Pacific, Atlanta)
Mr. Ryan Gesser (Georgia-Pacific, Atlanta)
Ms. Mary Hoffman (Georgia-Pacific Savannah River Mill, Rincon)
Mr. Jonathan Bandzul (Georgia Power, Atlanta)

1-hour Sulfur Dioxide National Ambient Air Quality Standards Attainment Demonstration

Georgia-Pacific Consumer Products LP – Savannah River Mill and Georgia Power Company – Plant McIntosh

November 11, 2016

Contents

List of Appendices

1.0 Introduction

1.1 Overview

In 2010, the U.S. Environmental Protection Agency (EPA) promulgated the 1-hour Sulfur Dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb). On August 10, 2015, EPA published the 1-hour SO_2 NAAQS Data Requirements Rule (DRR) that requires state regulatory agencies, including the Georgia Environmental Protection Division (EPD), to characterize SO_2 air quality in areas not designated as "nonattainment." The DRR affects SO_2 emitting sources with actual emissions of 2,000 tons per year or greater. SO_2 air quality near facilities will be characterized by either dispersion modeling or ambient SO_2 monitoring to designate the area as attainment or nonattainment relative to the 1-hour SO_2 NAAQS.

Georgia-Pacific Consumer Products LP (GP) - Savannah River Mill (SRM) and Georgia Power McIntosh Steam-Electric Generating Plant (Plant McIntosh) are affected sources under the DRR because SRM and Plant McIntosh each emitted more than 2,000 tons of SO_2 in 2014. SRM and Plant McIntosh notified Georgia EPD that the facilities have selected the air quality modeling option using three years (2012-2014) of actual SO_2 emissions to characterize air quality relative to the 2010 1-hour SO_2 NAAQS. GP and Georgia Power are submitting this modeling report to the Georgia EPD in response to a request dated February 12, 2016. The results of the analyses described in this report demonstrate attainment of the 1-hour SO_2 NAAQS in the area surrounding the SRM and Plant McIntosh.

1.2 Applicable Regulations and Guidance

The analyses described in this report were conducted in a manner that generally conforms to the following EPA regulations and guidance documents. Moreover, the analyses were conducted consistent with the dispersion modeling protocol submitted to the Georgia EPD on March 30, 2016 and with the addendum to the modeling protocol prepared by the Georgia EPD and submitted to the EPA on June 17, 2016. EPA provided comments on the modeling protocol on August 18, 2016. The Georgia EPD resubmitted a revised addendum for the modeling protocol to the EPA on October 18, 2016 addressing EPA's comments on the background concentration to be used in the modeling analysis. EPA approved the revised addendum on October 28, 2016. A copy of the modeling protocol and the addendum documentation are contained in Appendix A of this report.

- 40 CFR Part 51, Subpart BB: Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS)
- "SO_2 NAAQS Designations Modeling Technical Assistance Document (TAD)," Revised August 2016

- Guideline on Air Quality Models – 40 CFR Part 51, Appendix W, Revised November 9, 2005
- "AERMOD Implementation Guide," Revised August 3, 2015
- "Georgia Air Dispersion Modeling Guidance," Revised April 23, 2012

2.0 Modeled Sources

This section describes the sources simulated in the dispersion modeling analysis that was conducted to meet the DRR and demonstrate attainment of the 2010 1-hour SO_2 NAAQS.

2.1 Savannah River Mill

GP owns and operates a recycle and deinking paper mill (the Savannah River Mill, or SRM) in Rincon, Effingham County, Georgia. Figure 2-1 shows the location and Figure 2-2 provides a near-field aerial view of the SRM.

The primary operations at the SRM are pulping and bleaching operations, paper machines, converting and printing operations, and additional equipment necessary to support these operations including three power boilers (BO01 – Boiler No. 3, BO02 – Boiler No. 4, and BO03 – Boiler No. 5). Boiler Nos. 3 and 5 are circulating fluidized bed boilers and Boiler No. 4 is a bubbling fluidized bed boiler. Each boiler is equipped with a baghouse to control particulate matter (PM) emissions and a limestone injection system to control SO_2 emissions. Each boiler (BO01-BO03) exhausts to a dedicated 381-ft stack with an inner diameter of 7.25 ft. The actual hourly emissions, temperatures, and flow rates for 2012-2014 were modeled. Emission rates, temperature, and flow rates for each hour were recorded using continuous emissions monitoring systems (CEMS). Figure 2-3 shows the hourly SO_2 emission rates that were modeled through each stack.

GP analyzed hourly CEMS data to quantify the SO_2 emission rate from each boiler (BO01-BO03) for each hour of the 3-year period. The CEMS operates by measuring the volumetric SO_2 concentration in the exhaust gas (i.e., parts per million [ppm] by volume) and the flow rate in the standard cubic feet per hour (scfh).

A Sample calculation is presented below for April 7, 2013 Hour 1 for the Boiler No. 5 (BO03), using the conversion procedures listed in 40 CFR Part 75, Appendix F.

$E_h = KC_hQ_h$, where,

E_h = Hourly SO_2 mass emission rate during unit operation (lb/hr)
$K = 1.66 \times 10^{-7}$ lb/ppm-scf
C_h = Hourly average SO_2 concentration (ppm) during unit operation, stack moisture basis (280.5 ppm on April 7, 2013 at hour 1)
Q_h= Hourly average volumetric flow rate (scfh) during unit operation, stack moisture basis (5,496,000 scfh on April 7, 2013 at hour 1)

$E_h = 1.66 \times 10^{-7} \times 280.5 \text{ ppm} \times 5{,}496{,}000 \text{ scfh} = 255.91 \text{ lb/hr}$

The SRM also operates other miscellaneous sources that emit SO_2 as listed in Table 2-1. These emission sources were modeled at their maximum hourly SO_2 emission rate and representative stack parameters. These emissions units have considerably lower SO_2 emission rates than the boilers and can be reasonably and conservatively represented using a continuous, maximum emission rate. This approach is consistent with the SO_2 Modeling TAD, which in Section 5.4 explains, “States may find that use of allowable or PTE emissions is simpler and may show that an area would attain the standard with those conservative assumptions.”

Table 2-1. Modeled Emission Parameters for Miscellaneous Sources – Savannah River Mill

Modeled Stack ID	Stack Description	UTM East (m) [1]	UTM North (m) [1]	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (^0F)	SO_2 (lb/hr)
SCT1	CT COMMONSTK#1 (WH01 AND CT-01 EMISSIONS)	481039.37	3577380.62	165	12.00	77.8	500.0	19.05
SCT2	CT COMMONSTK#2 (WH02 AND CT-02 EMISSIONS)	481051.66	3577391.86	165	12.00	68.8	500.0	20.40
EP45	YANKEE WET END EXHAUST, PM # 16 (PM01)-BURNERS	480887.76	3577315.82	94	7.00	36.0	192.0	0.02
EP56	YANKEE DRY END EXHAUST, PM # 16 (PM01)-BURNERS	480913.21	3577286.86	94	7.00	41.8	200.0	0.02
EP66	YANKEE WET END EXHAUST, PM # 17 (PM02)-BURNERS	480931.43	3577356.04	94	6.25	36.5	478.0	0.02
EP67	YANKEE DRY END EXHAUST, PM # 17 (PM02)-BURNERS	480952.62	3577335.17	94	6.25	36.5	478.0	0.02
EP03	YANKEE WET END EXHAUST, PM # 18 (PM03)-BURNERS	480979.90	3577390.91	84	7.00	42.8	192.0	1.74
EP14	YANKEE DRY END EXHAUST, PM # 18 (PM03)-BURNERS	481005.12	3577361.89	84	7.00	42.6	194.0	1.74
EP24	YANKEE WET END EXHAUST, PM # 19 (PM04)-BURNERS	480843.47	3577272.61	84	7.00	37.1	220.0	0.01
EP37	YANKEE DRY END EXHAUST, PM # 19 (PM04)-BURNERS	480867.44	3577242.42	84	7.00	42.9	238.0	0.01
EP28	YANKEE WET END EXHAUST, PM # 20 (PM05)-BURNERS	480774.73	3577254.27	94	4.75	129.7	268.0	0.02
EP30	YANKEE DRY END EXHAUST, PM # 20 (PM05)-BURNERS	480800.72	3577220.48	94	4.75	129.7	270.0	0.02
FP12	Landfill Flare	481573.55	3575325.61	34	0.82	190.0	1400.7	3.45

[1] UTM Zone 17, NAD 83

The remaining sources of SO_2 emissions at the Savannah Mill are the diesel, gasoline and propane fired auxiliary and firewater pump engines are maintained for emergency purposes and are not operated simultaneously as part of normal facility operations except for intermittent, periodic testing for short, finite periods. Emissions and operation hours for these engines for year 2014 are provided in Table 2-2 for reference. As shown in the Table 2-2, the emissions from these sources are less than 0.1 tpy and the annual hours of operations are small. Therefore, these sources were excluded from the modeling analysis.

Table 2-2. Emissions and Hours of Operation for Engines – Savannah River Mill

Engine Description	Fuel Fired	Annual Hours of Operation (hrs/yr)	Annual Emissions (tpy)
Compressor Engines	Diesel	188.40	9.27E-02
Mill Radio	Propane	15.70	3.55E-07
Fire Pump	Diesel	26.10	6.18E-03
Block and Bleed CT Air Compressor	Gasoline	24.67	8.02E-05
Warehouse Fire Pump	Diesel	26.40	4.74E-03

Figure 2-1. Location of the Savannah River Mill

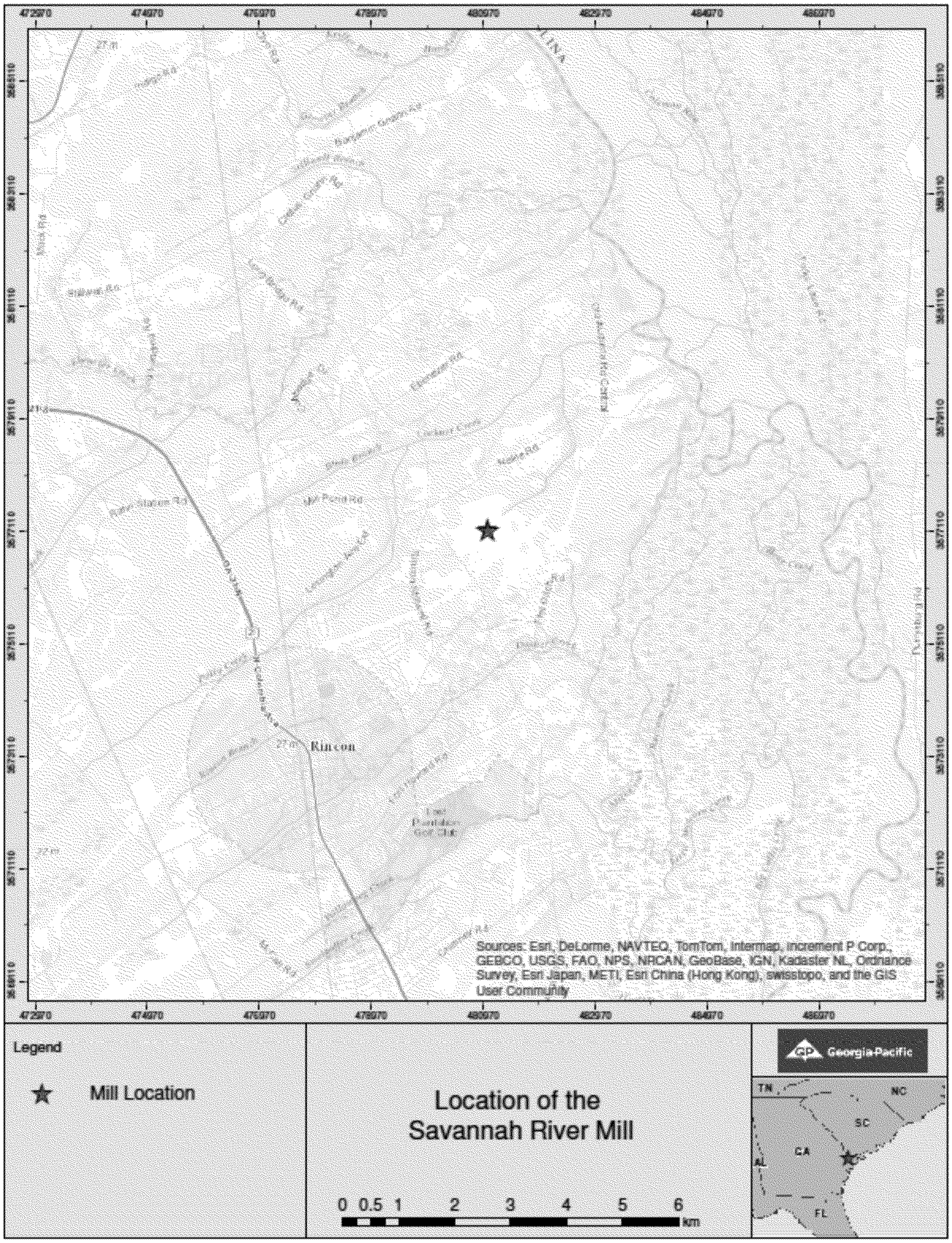

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Figure 2-2. Aerial View of the Savannah River Mill

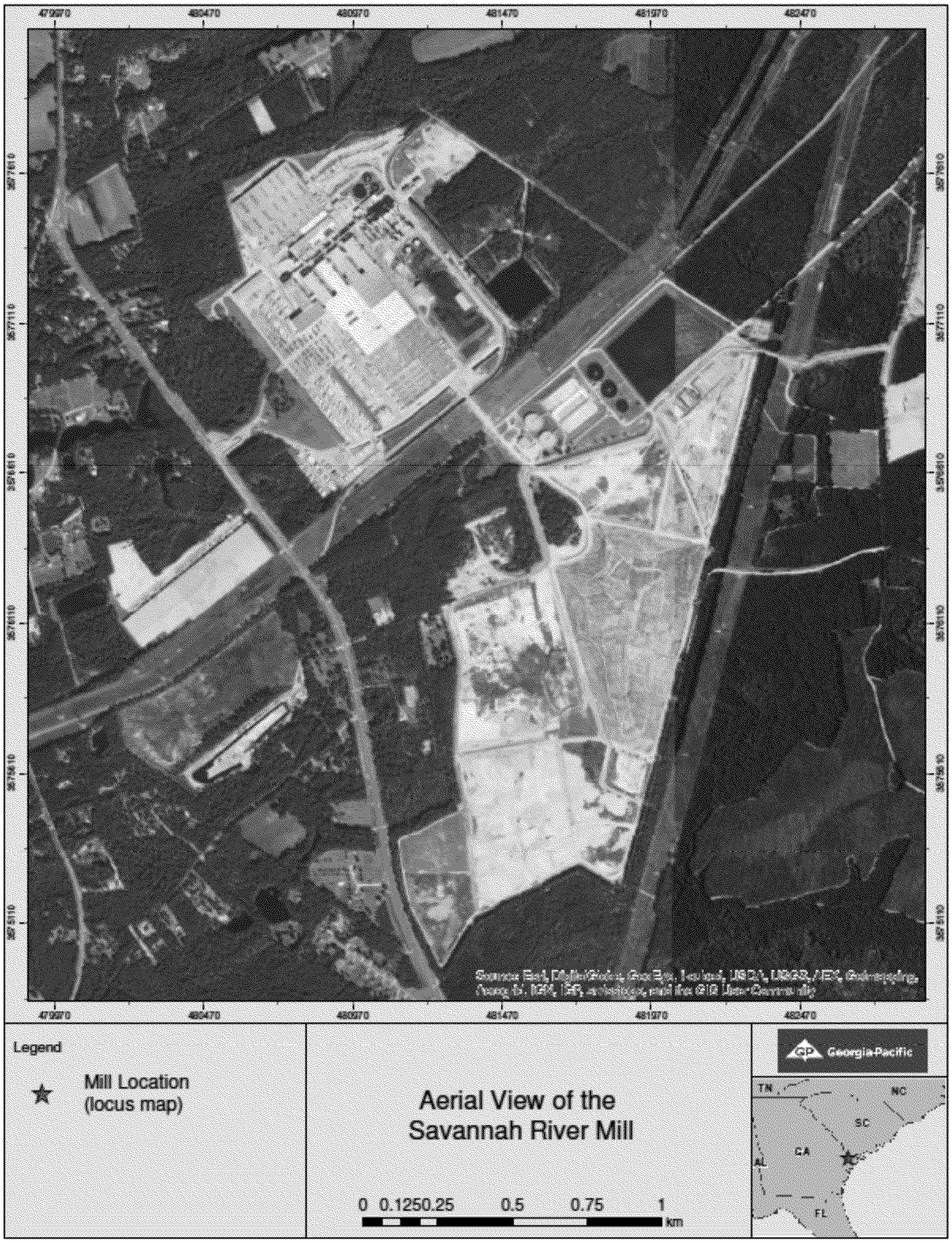
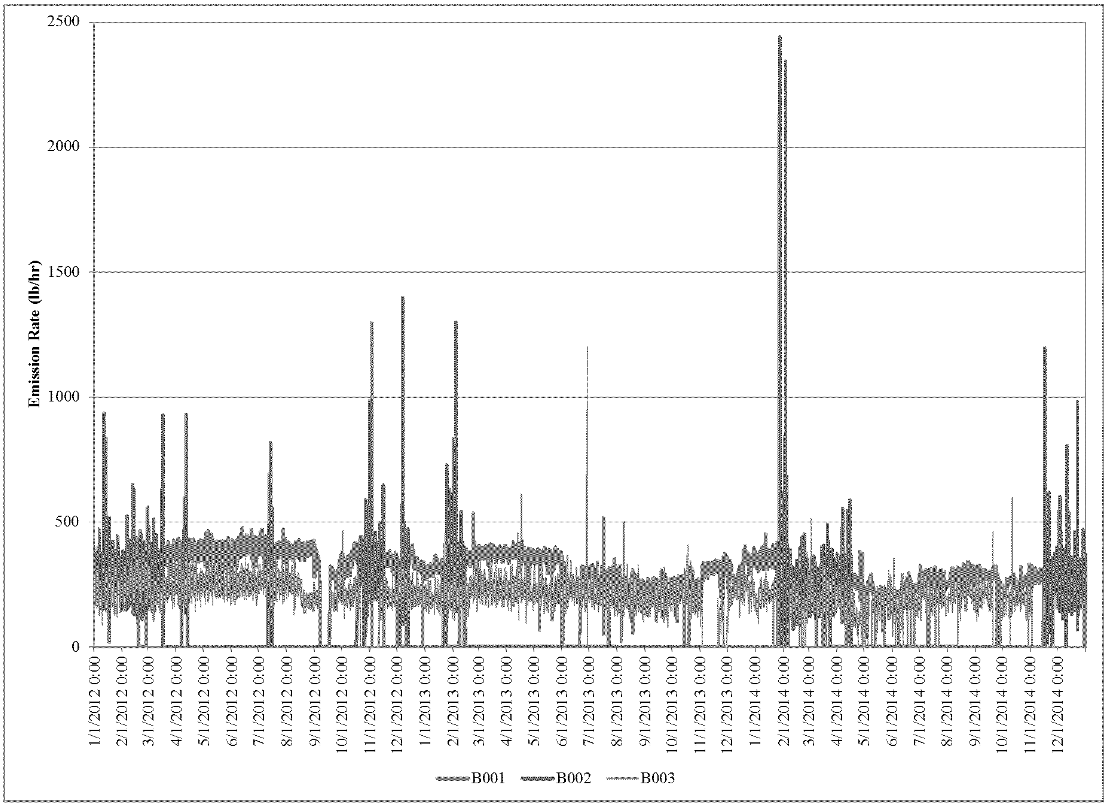


Figure 2-3. Savannah River Mill Hourly (2012-2014) SO_2 Emission Rates from Power Boilers



2.2 Plant McIntosh

Based on discussion with Georgia EPD on June 12, 2014, the modeling analysis also included Georgia Power's Plant McIntosh actual SO_2 emissions in 2012, 2013, and 2014. The location of the Plant McIntosh relative to the SRM is shown in Figure 2-4.

Plant McIntosh is an electric power generation plant including one steam electric generating unit (SG01) that primarily burns coal and eight simple cycle combustion turbines (CT1-CT8) that primarily burn natural gas. Ultra low sulfur diesel (ULSD) fuel is used as a startup fuel for the steam generating unit and as a backup fuel for the combustion turbines. The steam generating unit exhausts through one 400-ft stack, and each combustion turbine has its own stack that is 64 ft tall.

The McIntosh Combined-Cycle facility includes two combined-cycle power blocks. Each combined-cycle power block includes two combustion turbines (10A-B & 11A-B) each with a supplementally fired (duct burner) heat recovery steam generator (HRSG). Each combustion turbine fires natural gas (primary) and ULSD (backup). Each duct burner fires natural gas exclusively. Each combustion turbine is equipped with an evaporative inlet cooler and lube oil demister vents. The emissions from each combustion turbine exhausts through its own 160 ft stack.

For steam electric generating unit (SG01), the actual hourly emissions, temperatures, and flow rates for 2012-2014 were modeled. Emission and flow rates for each hour were reported to EPA Clean Air Markets Division (CAMD) under the Acid Rain Program using CEMS certified according to 40 CFR Part 75. Figure 2-5 shows the hourly SO_2 emission rates that were modeled in 2012, 2013, and 2014.

The modeled emission parameters for the simple cycle combustion turbines (CT1-CT8) and the combined cycle combustion turbines (10A-B & 11A-B) with duct burners included in the modeling analysis are listed in Table 2-3. The SO_2 emissions for the simple cycle combustion turbines (CT1-CT8) were based on 15 ppm ULSD combustion and for the combined cycle combustion turbines (10A-B&11A-B) were based on an emission rate of 0.0006 lb/MMBtu, including the heat input from the duct burners.

Figure 2-4. Location of the Plant McIntosh Relative to the Savannah River Mill

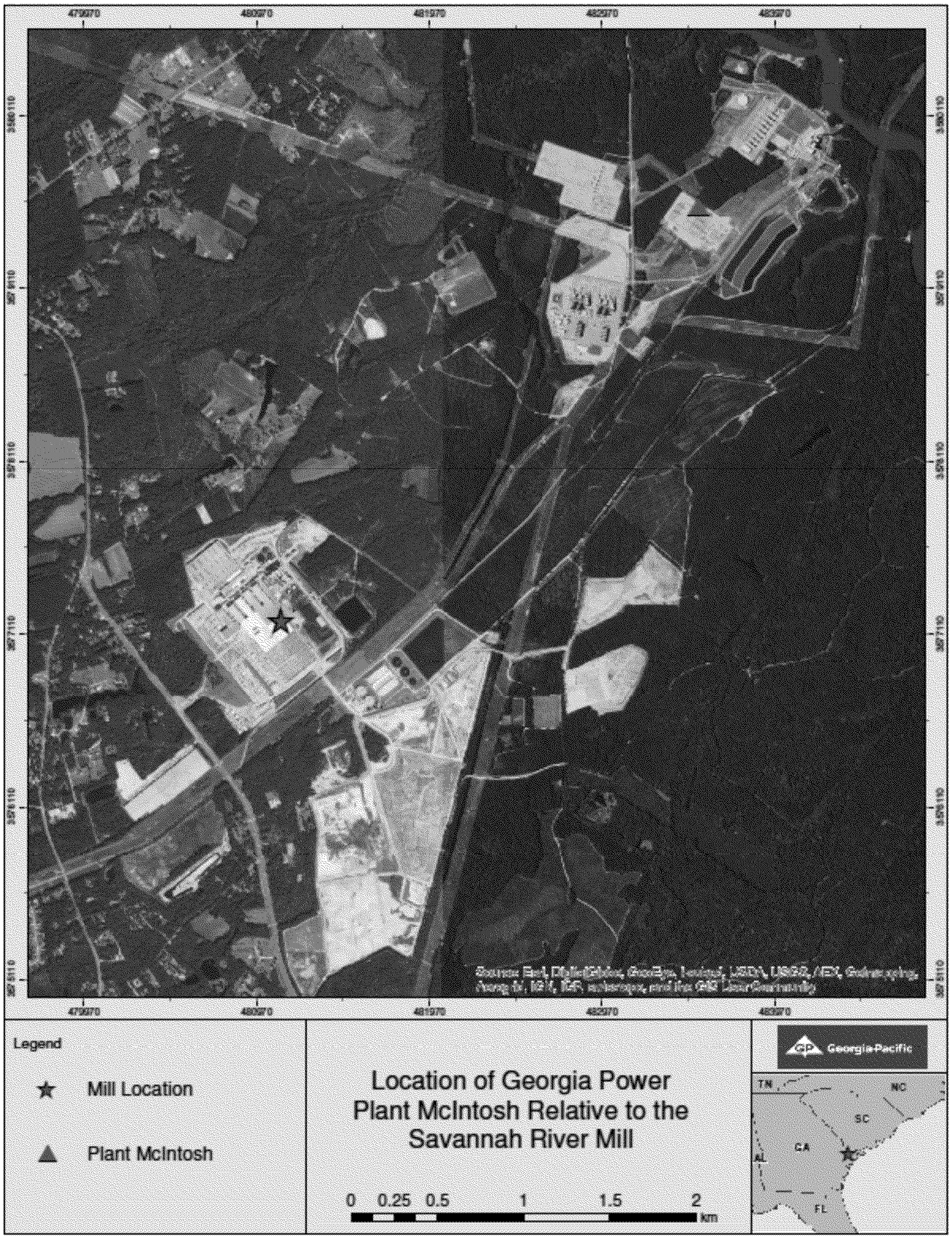


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Figure 2-5. Hourly (2012-2014) SO_2 Emission Rates for Steam Electric Generating Unit (SG01)

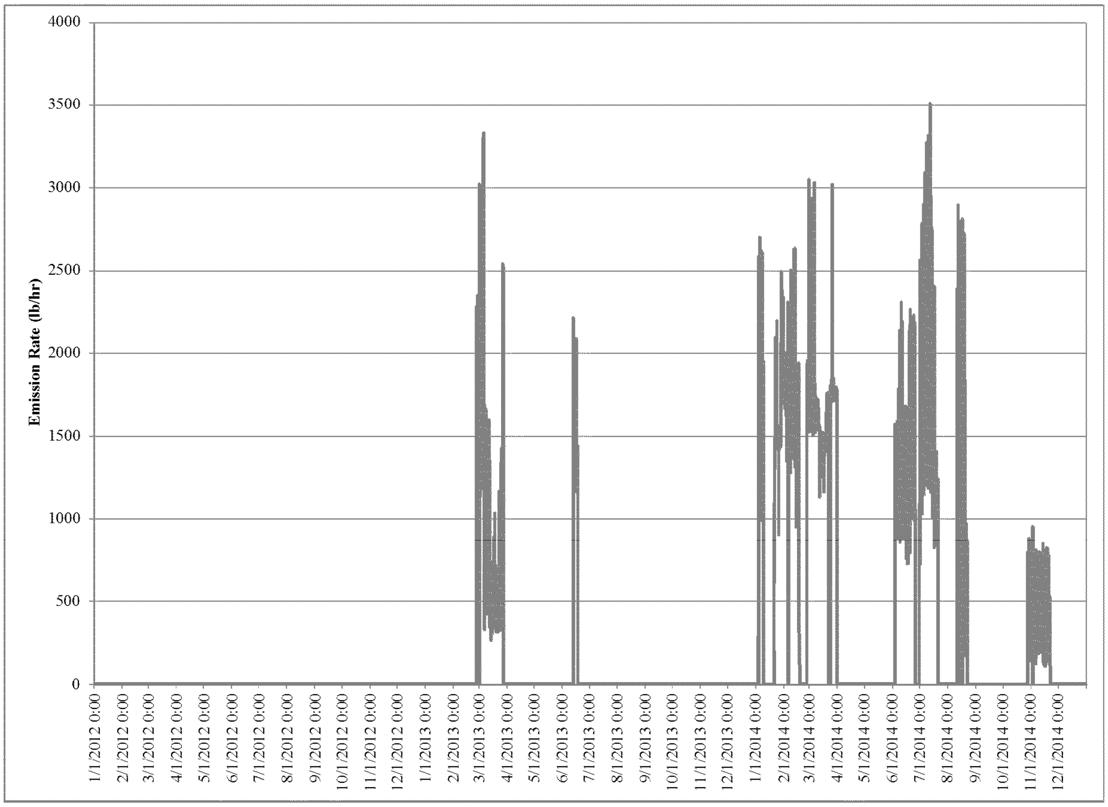

Table 2-3. Modeled Emission Parameters for Combustion Turbines – Plant McIntosh

Steam Plant CTs							
	UTM East[1] (m)	UTM North[1] (m)	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (°F)	SO_2 (lb/hr)
CT1	483974	3580104	64	15.5	134.5	984	1.93
CT2	483956	3580079	64	15.5	134.5	984	1.93
CT3	483938	3580055	64	15.5	134.5	984	1.93
CT4	483920	3580030	64	15.5	134.5	984	1.93
CT5	483902	3580005	64	15.5	134.5	984	1.93
CT6	483884	3579981	64	15.5	134.5	984	1.93
CT7	483866	3579956	64	15.5	134.5	984	1.93
CT8	483848	3579932	64	15.5	134.5	984	1.93
Combined-Cycle w/Duct Burner							
	UTM East[1] (m)	UTM North[1] (m)	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (°F)	SO_2 (lb/hr)
10A	482833	3578983	160	19	51.2	167	1.47
10B	482797	3578990	160	19	51.2	167	1.47
11A	482978	3578954	160	19	51.2	167	1.47
11B	482942	3578961	160	19	51.2	167	1.47

[1] UTM Zone 17, NAD 83

2.3 Nearby Sources

There are two electricity generating power plants (Effingham County Power, LLC in Georgia and Jasper Generating Station in South Carolina) within 10 km of SRM and Plant McIntosh. These sources were modeled at their potential SO_2 emission rates. The modeled emission parameters for the SO_2 emission sources at the Effingham County Power, LLC and the Jasper Generating facility are listed in Tables 2-4 and 2-5, respectively. The modeled emission parameters for the Effingham County Power, LLC were obtained from the Georgia EPD permit database and the Jasper Generating facility data were provided by Mr. John Glass with South Carolina Department of Health and Environmental Control (DHEC).

Table 2-4. Modeled Emission Parameters – Effingham County Power, LLC

Modeled Stack ID	Stack Description	UTM East (m)[1]	UTM North (m)[1]	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (^{0}F)	SO_2 (lb/hr)
ECT1	Combustion Turbine #1	473185	3571202	165	19.0	43.9	185	0.59
ECT2	Combustion Turbine #2	473216	3571239	165	19.0	43.9	185	0.59
ECT3DB3	Combustion Turbine #3	473281	3571262	165	19.0	61.3	202	3.90
ECT3DB4	Combustion Turbine #4	473281	3571262	165	19.0	61.3	202	3.90
AUX1	AuxiliaryBoiler #1	473218	3571240	39.1	2.60	18.1	476	0.02
AUX2	AuxiliaryBoiler #2	473281	3571262	39.1	2.60	18.1	476	0.02

[1] UTM Zone 17, NAD 83

Table 2-5. Modeled Emission Parameters – Jasper Generating Facility

Modeled Stack ID	Stack Description	UTM East (m)[1]	UTM North (m)[1]	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (^{0}F)	SO_2 (lb/hr)
ECT1	Combustion Turbine #1	488328.76	3580242.58	190	18	72.6	278	106.5
ECT2	Combustion Turbine #2	488371.38	3580243.66	190	18	72.6	278	106.5
ECT3	Combustion Turbine #3	488414.95	3580242.54	190	18	72.6	278	106.5

[1] UTM Zone 17, NAD 83

For the offsite sources located more than 10 km from SRM, the dispersion modeling analysis used the 20D rule, which is a screening procedure that was designed to identify the most relevant off-property sources to be included in a site-wide cumulative analysis. The rule allows for sources that have an emission rate (Q) in tons/year less than 20 times the distance (d) in kilometers from the source to the site be excluded from the modeling evaluation.

Figure 2-6 contains a spatial map of annual 2014 SO_2 emissions (tpy) from offsite sources within 50 km from SRM. Table 2-6 contains a detailed list of facilities within 50 km from SRM and the emission (tpy)/distance (km), or Q/d. International Paper (IP) - Savannah is over 20 km away and was modeled separately as part of the DRR to characterize 1-hour SO_2 NAAQS in Chatham County. As described in the modeling protocol addendum (refer to Appendix A), to account for the impacts from IP-Savannah, the modeling analysis used the maximum modeled SO_2 concentration of 50.3 µg/m^3 (19.2 ppb) from IP-Savannah (without background added) along the northern and upper western modeling domain boundary. Using this value to represent the impacts from IP-Savannah in the Plant McIntosh/Georgia Pacific Savannah River Mill modeling domain represents a very conservative assumption since the SO_2 concentrations continue to decrease at further distances.

The impact from Georgia Power Plant Kraft, Weyerhaeuser NR Port Wentworth, and Imperial-Savannah, L.P. were included in the background concentration as explained in Section 3.3 of this modeling report. All the remaining Q/d values are less than 20. Therefore, no additional offsite sources were explicitly modeled.

Figure 2-6. Map of actual annual 2014 SO_2 emissions (tpy) from offsite sources near the Savannah River Mill. Red circles are placed in 10 km increments out to 50 km.

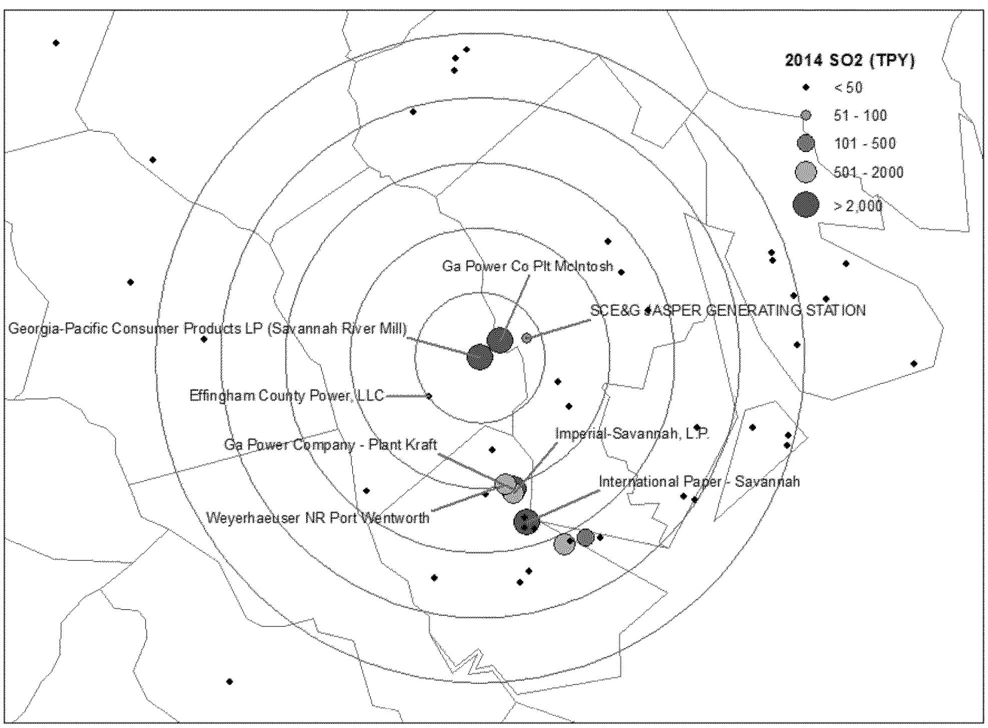

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Table 2-6. List of facilities within 50 km of the Savannah River Mill and the actual SO_2 emissions (tpy) / distance (km), or Q/d.

Facility ID	Facility Name	SO_2 Emissions (tpy)	Dist. (km)	Q/d
10300003	Ga Power Co Plant McIntosh	2,267.8	4.1	549.00
5100007	International Paper - Savannah	8,122.7	26.3	308.85
5100006	Ga Power Company - Plant Kraft	5,140.1	20.9	245.94
5100010	Weyerhaeuser NR Port Wentworth	570.3	19.9	28.66
5100110	Imperial-Savannah, L.P.	582.0	21.5	27.07
5100077	Southern States Phosphate & Fertilizer	597.1	31.6	18.90
13005611	SCE&G Jasper Generating Station	98.6	7.9	12.48
10300014	Ga Power Company - McIntosh Combined Cycle Facility	15.9	2.5	6.36
5100008	Savannah Acid Plant LLC	125.2	32.2	3.89
5100148	Arizona Chemical Corporation	34.7	27.1	1.28
5100205	Superior Landfill & Recycling Center	42.6	34.6	1.23
10300012	Effingham County Power, LLC	3.2	9.8	0.33
5100037	EMD Millipore Corporation	4.5	14.4	0.31
8306411	Santee Cooper Hilton Head	14.4	49.3	0.29
5100076	Colonial Terminals, Inc.	6.4	27.7	0.23
4781011	USMC Recruit Depot	9.9	49.0	0.20
4802311	Elliott Sawmilling	7.4	44.3	0.17
10300004	Simpson Lumber Company, LLC	2.0	26.9	0.07
3100028	Claude Howard Lumber Company, Inc.	3.6	55.1	0.07
3100005	W. M. Sheppard Lumber Co Inc.	2.4	42.6	0.06
4508411	Hickory Hill Landfill/Recycling	1.5	27.0	0.06
9186311	Hilton Head Airport	1.3	49.0	0.03
5100149	Hunter Army Airfield	0.4	35.1	0.01
9159411	Ridgeland	0.2	26.6	0.01
5100019	Georgia-Pacific Gypsum LLC- Savannah Plant	0.1	31.5	0.00
17012111	Haig Point Club	0.1	39.8	0.00
5100046	Gulfstream Aerospace Corporation	0.1	21.1	0.00
5100012	Axeon Specialty Products	0.1	25.6	0.00
5100003	Southern LNG Company, L.L.C. -Elba Island LNG	0	33.4	0.00
4834011	US Marine Corps Air Station	0	47.5	0.00
5100017	Ga Power Company - Plant Boulevard	0	33.7	0.00
16906311	Coastal Debris	0	25.5	0.00
4508311	SCE&G Hardeeville	0	12.6	0.00
12084911	Beaufort County Memorial Hospital	0	49.3	0.00
11099511	Melrose Landing	0	38.0	0.00
16083011	Salty Fare Landing	0	43.5	0.00
4760611	Valmont Composite Structures Estill	0	46.1	0.00
9159511	Athena Corporation	0	15.7	0.00
11426511	Davis	0	39.1	0.00
10942511	Harpers	0	47.4	0.00
12486811	Beaufort MCAS /Merritt Field	0	47.8	0.00

3.0 Dispersion Modeling Analysis

3.1 Modeling Procedures

3.1.1 Model Selection

The modeling analysis was performed using the latest regulatory version (15181) of EPA's American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD). AERMOD is a steady-state plume dispersion model that is recommended by EPA's *Guideline on Air Quality Models*[1]. The modeling analysis using AERMOD utilized the regulatory default options to compute concentrations at all receptors as discussed in Section 3.2.1.

3.1.2 Building Downwash

The SO_2 Modeling TAD specifies that for the purposes of modeling with actual emissions to characterize air quality for SO_2 designations, the EPA recommends the use of actual stack heights so that the modeling analysis can most closely represent the actual ambient air quality conditions as influenced by the source. If modeling with allowable emissions, however, the "Good Engineering Practice" ("GEP") stack policy should be used in the model.

GP used actual stack heights for the SO_2 emission sources at SRM and Plant McIntosh modeled with actual emissions. Miscellaneous sources at SRM listed in Table 2-1 and nearby sources that were modeled with the allowable emission rates were evaluated to determine the maximum creditable GEP stack height. The actual stack heights for the miscellaneous sources at SRM were lower than the GEP stack heights; therefore, the miscellaneous sources were modeled with the actual stack heights.

A GEP stack height analysis was performed for all point/stack sources included in the modeling in accordance with EPA's guidelines. Per the guidelines, the physical GEP height ("H_{GEP}") is determined from the dimensions of all buildings that are within the region of influence using the following equation:

$H_{GEP} = H + 1.5L$, where:

H = height of the structure within $5L$ of the stack which maximizes H_{GEP}, and
L = lesser dimension (height or projected width) of the structure.

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[1] *Revisions to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, 40 CFR Part 51, Appendix W, November 9, 2005.*

For a squat structure (*i.e.,* height less than projected width), the formula reduces to:

$$H_{GEP} = 2.5H$$

Wind direction-specific building dimensions and downwash parameters for input to AERMOD were developed with the PRIME version of US EPA's Building Profile Input Program (BPIP-PRIME Version 04274). BPIP-PRIME input and output data are provided on the modeling archive CD enclosed with this report.

3.1.3 Dispersion Environment

EPA Modeling Guidelines recommend the use of the Auer scheme in which the land use within a three-kilometer (3-km) area was evaluated to determine the dispersion environment surrounding the site.

As shown in Figure 3-1, the satellite imagery of the 3-km area surrounding the SRM indicates the area is predominantly rural. Therefore, AERMOD was run using default dispersion algorithms and the urban dispersion option was not enabled.

3.2 Meteorological Data

Because site-specific meteorological data was not available, the hourly meteorological data from the Savannah/Hilton Head International Airport located in Savannah, Georgia (surface) and the Charleston International Airport, South Carolina (upper air) National Weather Service stations for the period of 2012-2014 were used in the modeling analysis. Georgia EPD pre-processed this data using current regulatory versions of AERMET (15181), AERSURFACE (13016), and AERMINUTE (15272) and makes them available on the EPD website. The surface elevation of 15.5 meters was used in AERMOD. The locations of the Savannah International Airport and Charleston International Airport relative to the SRM are shown in Figure 3-2 and Figure 3-3 shows the 3-year wind rose for the Savannah International Airport. As shown in the Figure 3-3, winds are predominantly from the southwest.

Although the Savannah/Hilton Head International Airport is designated as representative data for facilities in Effingham County, a demonstration must be made to show that the meteorological data from the Savannah/Hilton Head International Airport is representative of the area in which SRM and Plant McIntosh are located. In addition to being representative, the data must meet quality and completeness requirements per EPA guidelines. Surface observations from the Savannah/Hilton Head International Airport are presumptively representative of conditions near the SRM because of the short distance (approximately 14 miles or 23 km) separating the two locations and flat terrain characteristics of the Atlantic seaboard. A comparison of the surface characteristics (albedo, Bowen ratio, and surface roughness) between the Savannah Airport NWS surface meteorological station, the SRM, and the Plant McIntosh are shown in Table 3-1. All three sets used AERSURFACE (13016) derived for each of twelve 30-degree sectors over four seasons, in accordance with the AERMOD Implementation Guide. Albedo and Bowen ratio are relatively similar at all three sites. The average surface roughness is 0.2 m for the SRM, 0.2 m for Plant McIntosh, and 0.1 m for the Savannah airport. The surface roughness values for all three sites are characteristic of common grassland/herbaceous wetlands and no significant differences in the albedo, Bowen ratio, and surface roughness were found. Therefore, the Savannah Airport NWS surface meteorological station characteristics were used in the modeling. A more extensive discussion of the data representativeness is provided in the modeling protocol included in Appendix A.

3.2.1 Model Receptor Grid

A comprehensive Cartesian receptor grid, extending approximately 20 km from the SRM was used in the AERMOD modeling analyses to assess maximum ground-level SO_2 concentrations. The Cartesian receptors grid consists of the following receptor spacing:

- From the center of SRM to a distance of 5,000 meters (m) at 100-m intervals
- Beyond 5,000 m to 10,000 m at 500-m intervals
- Beyond 10,000 m to 20,000 m at 1000-m intervals

The maximum impact was located at a receptor spaced at 100 m. Receptors were also placed at 100 m intervals within SRM, Plant McIntosh, Effingham County Power, LLC, and Jasper Generating facility ambient air boundary. Although the SO_2 Modeling TAD specifies that receptors need not be placed at locations where it is not feasible to place a monitor (e.g., water bodies and within facility property lines), the receptor grid conservatively simulates all areas including within each facility's ambient air boundary that is not generally accessible to the public. This receptor grid represents a very conservative approach to the modeling analysis.

Terrain elevations from the National Elevation Dataset (NED) acquired from USGS[2] were processed with AERMAP (version 11103) to develop the receptor elevations. All receptor locations were represented in the Universal Transverse Mercator projection (UTM), Zone 17, North American Datum 1983. The NED file(s) are provided on the modeling archive CD in Appendix B. Near-field and far-field views of the receptor locations are shown in Figures 3-4 and 3-5, respectively.

[2]http://www.mrlc.gov/viewerjs

Table 3-1. Comparisons of surface characteristics (albedo, Bowen ratio, and surface roughness) at the Savannah Airport NWS station, the Georgia-Pacific Savannah River Mill facility site, and the Georgia Power Plant McIntosh facility site.

Season	Sector	Savannah Airport			Savannah River Mill			Plant McIntosh		
		Surface Albedo	Bowen Ratio	Surface Roughness	Surface Albedo	Bowen Ratio	Surface Roughness	Surface Albedo	Bowen Ratio	Surface Roughness
Winter	1	0.15	0.57	0.023	0.14	0.47	0.263	0.14	0.40	0.057
Winter	2	0.15	0.57	0.036	0.14	0.47	0.205	0.14	0.40	0.300
Winter	3	0.15	0.57	0.043	0.14	0.47	0.076	0.14	0.40	0.171
Winter	4	0.15	0.57	0.064	0.14	0.47	0.047	0.14	0.40	0.292
Winter	5	0.15	0.57	0.046	0.14	0.47	0.081	0.14	0.40	0.238
Winter	6	0.15	0.57	0.02	0.14	0.47	0.074	0.14	0.40	0.334
Winter	7	0.15	0.57	0.153	0.14	0.47	0.265	0.14	0.40	0.144
Winter	8	0.15	0.57	0.178	0.14	0.47	0.273	0.14	0.40	0.056
Winter	9	0.15	0.57	0.211	0.14	0.47	0.141	0.14	0.40	0.274
Winter	10	0.15	0.57	0.093	0.14	0.47	0.143	0.14	0.40	0.147
Winter	11	0.15	0.57	0.03	0.14	0.47	0.111	0.14	0.40	0.043
Winter	12	0.15	0.57	0.016	0.14	0.47	0.139	0.14	0.40	0.108
Spring	1	0.15	0.48	0.029	0.14	0.4	0.302	0.14	0.34	0.066
Spring	2	0.15	0.48	0.042	0.14	0.4	0.242	0.14	0.34	0.334
Spring	3	0.15	0.48	0.05	0.14	0.4	0.092	0.14	0.34	0.198
Spring	4	0.15	0.48	0.073	0.14	0.4	0.056	0.14	0.34	0.341
Spring	5	0.15	0.48	0.055	0.14	0.4	0.099	0.14	0.34	0.274
Spring	6	0.15	0.48	0.028	0.14	0.4	0.094	0.14	0.34	0.386
Spring	7	0.15	0.48	0.192	0.14	0.4	0.296	0.14	0.34	0.167
Spring	8	0.15	0.48	0.224	0.14	0.4	0.315	0.14	0.34	0.071
Spring	9	0.15	0.48	0.259	0.14	0.4	0.170	0.14	0.34	0.336
Spring	10	0.15	0.48	0.122	0.14	0.4	0.174	0.14	0.34	0.186
Spring	11	0.15	0.48	0.039	0.14	0.4	0.137	0.14	0.34	0.056
Spring	12	0.15	0.48	0.022	0.14	0.4	0.169	0.14	0.34	0.131
Summer	1	0.15	0.39	0.041	0.14	0.3	0.365	0.14	0.27	0.070
Summer	2	0.15	0.39	0.050	0.14	0.3	0.270	0.14	0.27	0.344
Summer	3	0.15	0.39	0.056	0.14	0.3	0.105	0.14	0.27	0.204
Summer	4	0.15	0.39	0.079	0.14	0.3	0.064	0.14	0.27	0.359
Summer	5	0.15	0.39	0.061	0.14	0.3	0.114	0.14	0.27	0.305
Summer	6	0.15	0.39	0.035	0.14	0.3	0.110	0.14	0.27	0.467
Summer	7	0.15	0.39	0.208	0.14	0.3	0.318	0.14	0.27	0.185
Summer	8	0.15	0.39	0.242	0.14	0.3	0.350	0.14	0.27	0.087
Summer	9	0.15	0.39	0.270	0.14	0.3	0.234	0.14	0.27	0.374
Summer	10	0.15	0.39	0.138	0.14	0.3	0.207	0.14	0.27	0.213
Summer	11	0.15	0.39	0.048	0.14	0.3	0.175	0.14	0.27	0.067
Summer	12	0.15	0.39	0.029	0.14	0.3	0.244	0.14	0.27	0.145
Fall	1	0.15	0.57	0.036	0.14	0.47	0.350	0.14	0.40	0.068
Fall	2	0.15	0.57	0.045	0.14	0.47	0.250	0.14	0.40	0.341
Fall	3	0.15	0.57	0.05	0.14	0.47	0.093	0.14	0.40	0.202
Fall	4	0.15	0.57	0.073	0.14	0.47	0.056	0.14	0.40	0.357
Fall	5	0.15	0.57	0.055	0.14	0.47	0.099	0.14	0.40	0.298
Fall	6	0.15	0.57	0.029	0.14	0.47	0.095	0.14	0.40	0.450
Fall	7	0.15	0.57	0.192	0.14	0.47	0.299	0.14	0.40	0.170
Fall	8	0.15	0.57	0.228	0.14	0.47	0.334	0.14	0.40	0.075
Fall	9	0.15	0.57	0.26	0.14	0.47	0.222	0.14	0.40	0.358
Fall	10	0.15	0.57	0.124	0.14	0.47	0.190	0.14	0.40	0.195
Fall	11	0.15	0.57	0.041	0.14	0.47	0.159	0.14	0.40	0.058
Fall	12	0.15	0.57	0.023	0.14	0.47	0.231	0.14	0.40	0.139

Figure 3-1 Land Use within 3 km of the Savannah River Mill

Figure 3-2 Location of the Meteorological Data Observation Sites Relative to the Savannah River Mill

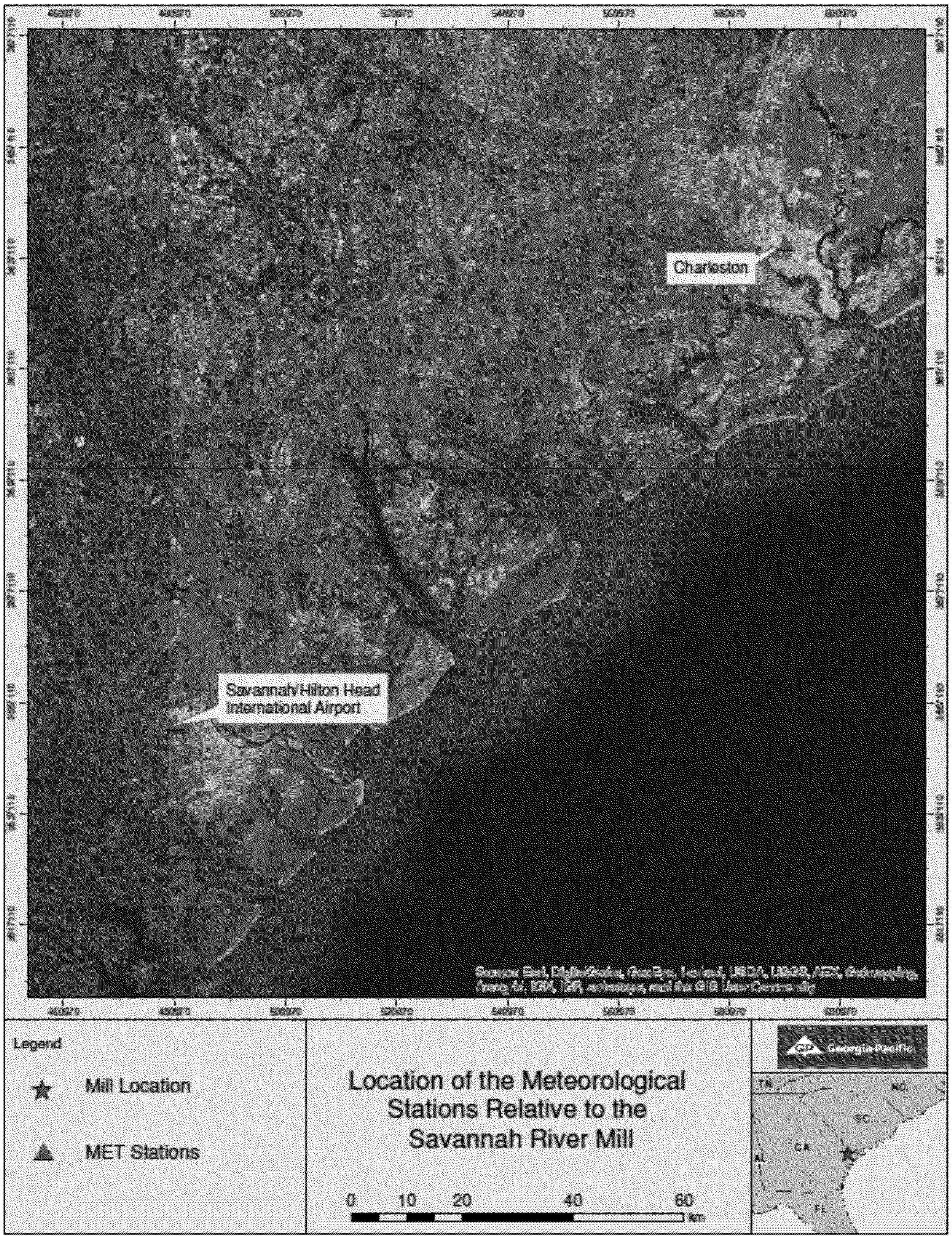

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Figure 3-3 Three-year Wind Rose (2012-2014): Savannah International Airport

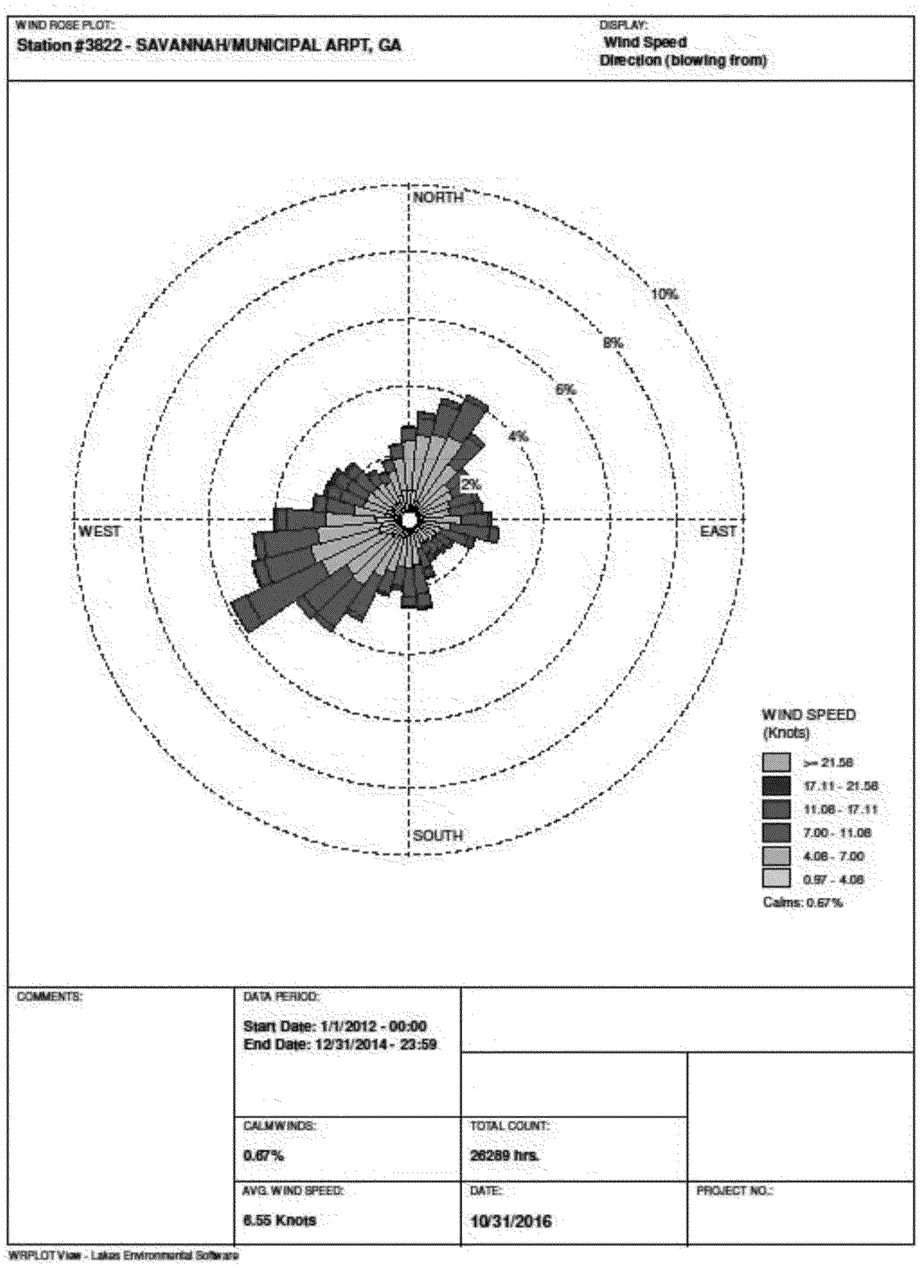

Figure 3-4 Near-Field View of the Receptor Grid

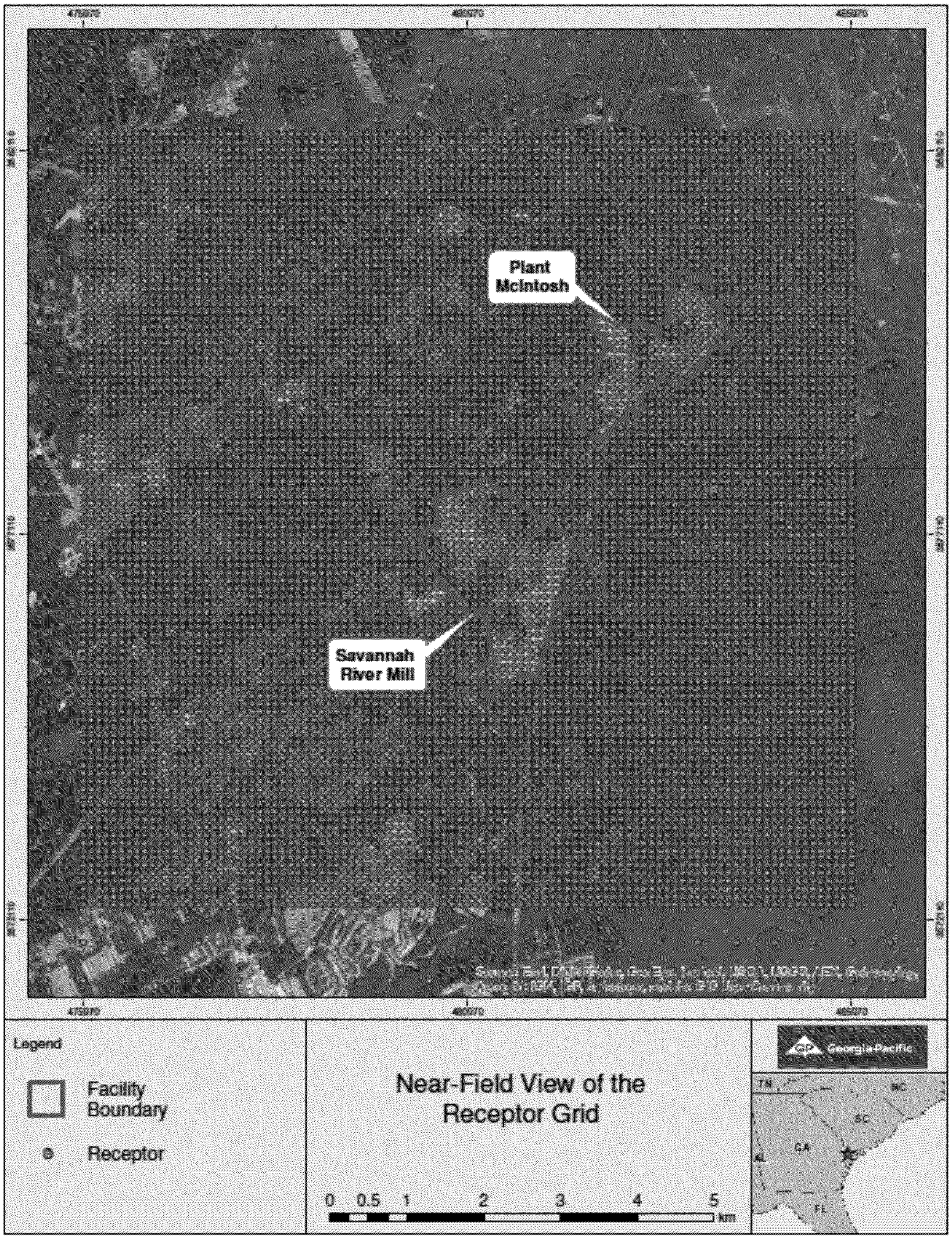

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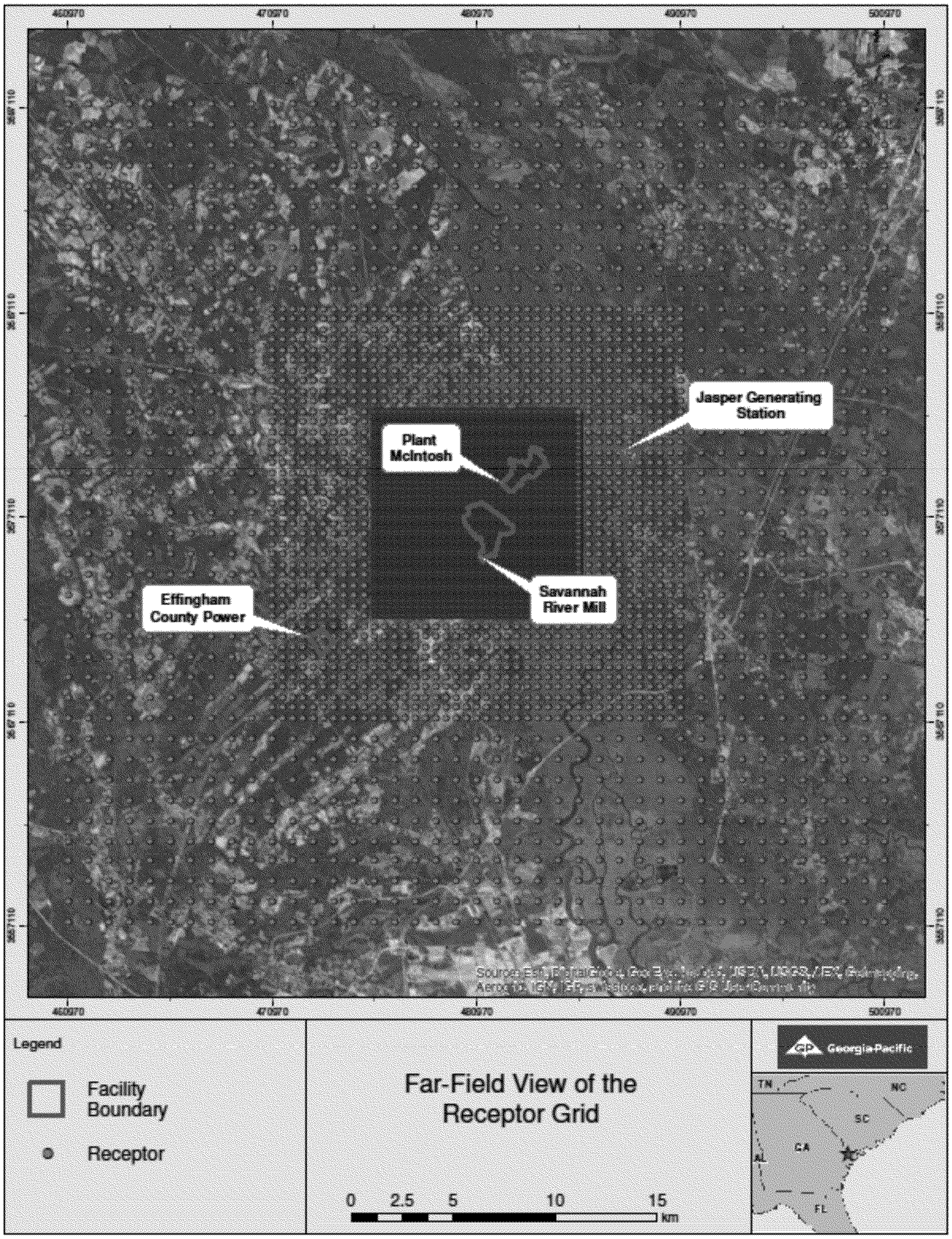
Figure 3-5 Far-Field View of the Receptor Grid



3.3 Background Concentration

As part of the 1-hour SO_2 NAAQS analysis, ambient background was added to modeled concentrations to assess compliance with the 1-hour SO_2 NAAQS. The seasonal hour of day background concentration for 1-hour SO_2 was provided by the Georgia EPD. These background values represent impacts from all large sources in Savannah (e.g., Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft, plus other nearby sources) except IP-Savannah (represented by a boundary condition) surrounding the Lathrop & Augusta SO_2 monitor (13-051-1002). The seasonal hour of day background concentrations were calculated for each of the four seasons using the following steps:

1. For each of the three years of data, SO_2 data was sorted by wind direction.
2. All SO_2 values corresponding to a wind direction between 10° and 45° were ignored since those impacts were directly attributable to IP-Savannah.
3. For each year, the remaining SO_2 data was sorted by season; spring (March-May), summer (June-August), fall (September- November), and winter (December-February).
4. For each season, SO_2 data was sorted by hour of day.
5. For each year and season, the second highest SO_2 value was selected for each hour of the day.
6. The average over the three years of the second highest SO_2 value was calculated for each hour of the day for each season.

This modeling analysis used 2012-2014 SO_2 data to develop the seasonal hour of day SO_2 background concentrations to be consistent with the actual emissions and meteorology used in the Plant McIntosh/Georgia Pacific Savannah River Mill modeling. Table 3-2 and Figure 3-6 show the seasonal hour of day SO_2 background concentrations used in the modeling analysis.

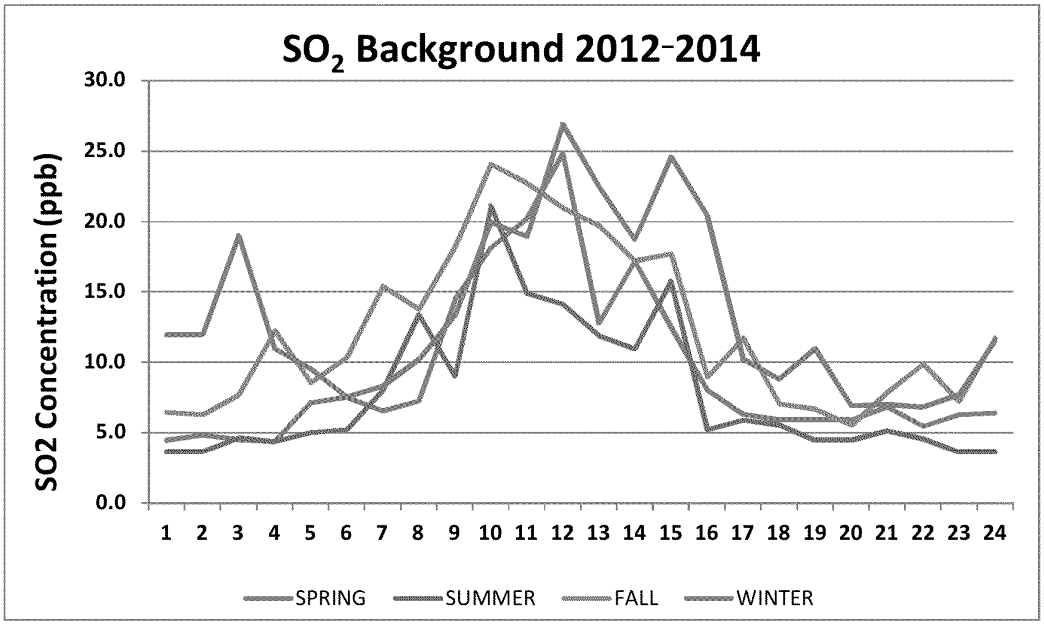
Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft are located approximately 7 km away from the Augusta & Lathrop SO_2 monitor. These same facilities are located approximately 20 km away from Plant McIntosh and Georgia Pacific Savannah River Mill. Therefore, the use of the 2012-2014 seasonal hour of day background SO_2 concentrations were a conservative estimate of the background (not including IP-Savannah) since the Plant McIntosh and Georgia Pacific Savannah River Mill modeling domain is further away from Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft than the Augusta & Lathrop SO_2 monitor.

By adding 50.3 $\mu g/m^3$ (19.2 ppb) from IP-Savannah to the 2012-2014 seasonal hour of day background SO_2 concentrations described above, the impacts from IP-Savannah, Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft were conservatively accounted for in the combined seasonal hour of day SO_2 background concentration. This combined seasonal hour of day SO_2 background concentration were added to the modeled design concentration for the sources that were explicitly modeled in the Plant McIntosh/Georgia Pacific Savannah River Mill modeling domain and compared to the NAAQS.

Table 3-2. Seasonal hour of day background SO_2 concentration (ppb) in Savannah (not including IP-Savannah) for 2012-2014.

Hour of Day	Winter	Spring	Summer	Fall
1	12.0	4.5	3.6	6.5
2	12.0	4.9	3.7	6.3
3	19.0	4.5	4.7	7.7
4	11.0	4.4	4.4	12.3
5	9.6	7.1	5.0	8.6
6	7.6	7.5	5.2	10.4
7	8.3	6.6	8.0	15.4
8	10.2	7.3	13.4	13.8
9	13.4	14.5	9.0	18.2
10	20.0	18.1	21.1	24.1
11	19.0	20.3	14.9	22.8
12	26.9	24.9	14.1	21.0
13	22.5	12.8	11.9	19.8
14	18.7	17.2	11.0	17.2
15	24.6	12.5	15.8	17.7
16	20.5	8.1	5.2	9.0
17	10.2	6.3	5.9	11.7
18	8.8	5.9	5.6	7.1
19	11.0	5.9	4.5	6.7
20	6.9	5.9	4.5	5.6
21	7.0	6.8	5.2	7.9
22	6.8	5.5	4.6	9.9
23	7.7	6.3	3.6	7.3
24	11.6	6.4	3.6	11.7

Figure 3-6. Seasonal hour of day SO_2 background concentration in Savannah (not including IP-Savannah) for 2012-2014.



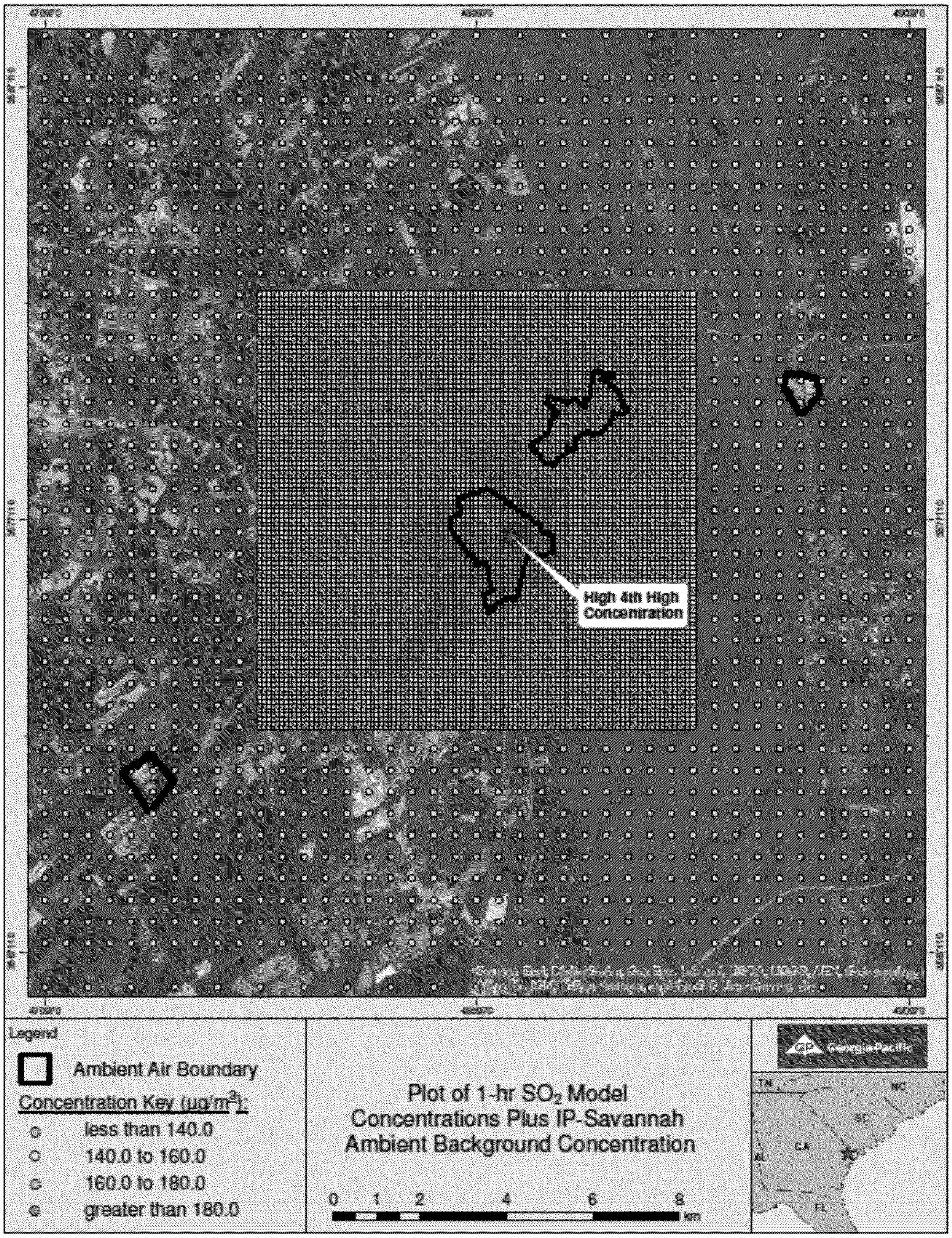
3.4 Modeled Design Concentration

The modeled design concentration was calculated by AERMOD (version 15181) using actual hourly emissions from 2012-2014 along with the 2012-2014 seasonal hour of day background SO_2 concentrations listed in Table 3-2 and reflects the three-year average of the 99th percentile ranked daily maximum 1-hour SO_2 concentration. The highest, 4th-high daily 1-hour maximum modeled concentration among all receptors represents the 99th percentile, which the model averages over the three meteorological data years simulated to determine the modeled design concentration. The total SO_2 concentration was calculated as the sum of the modeled design concentration from the Savannah River Mill, Plant McIntosh, Effingham County Power, LLC, Jasper Generating facility including the seasonal hour of background concentration, plus the 50.3 µg/m^3 (19.2 ppb) from IP-Savannah. The modeling results for the 1-hour SO_2 NAAQS are presented in Table 3-3 and show the 4th highest modeled daily maximum 1-hour SO_2 concentration averaged over three years, plus the background concentration, is 187.42 µg/m^3. This value is below the NAAQS level of 196.34 µg/m^3. This result demonstrates attainment of the 1-hour SO_2 NAAQS in the area surrounding the SRM and Plant McIntosh. Contours of the predicted impacts are shown in the Figure 3-7.

Table 3-3. Summary of 99th Percentile 1-hour Average SO_2 modeled concentrations averaged over 2012-2014

Years	2012	2013	2014
99th Percentile 1-hour Concentration (μg/m^3) including seasonal background	123.33	142.50	145.52
99th Percentile 1-hour Average Concentration (μg/m^3) including seasonal background	137.12		
IP-Savannah 1-hour Average Background Concentration (μg/m^3)	50.30		
99th Percentile 1-hour Average + Background Concentration (μg/m^3)	187.42		
1-hour SO_2 NAAQS (μg/m^3)	196.34		

Figure 3-7. Modeled 1-hr Average SO_2 Concentrations



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Appendix A

Modeling Protocol and Addendum to Modeling Protocol

Modeling Protocol

Georgia-Pacific

Georgia-Pacific Consumer Products LP
Savannah River Mill
437 Old Augusta Road South
Rincon, GA 31326

March 30, 2016

Dr. James Boylan
Manager, Planning & Support Program
Georgia Environmental Protection Division
Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, GA 30354

RE: Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide Primary NAAQS
Air Quality Modeling Protocol for Effingham County
Georgia-Pacific Consumer Products LP – Savannah River Mill (AIRS ID: 10300007)
Georgia Power Company – Plant McIntosh (AIRS ID: 10300003)

Dear Dr. Boylan:

EPA's Data Requirements Rule (DRR) for the 2010 1-Hour Sulfur Dioxide (SO_2) National Ambient Air Quality Standards (NAAQS) (40 CFR Part 51, Subpart BB) requires that state air quality regulatory agencies characterize air quality in the areas surrounding certain sources of SO_2 emissions. In a letter dated January 14, 2016 to EPA Region 4, the Georgia Environmental Protection Division (EPD) identified the Georgia-Pacific Consumer Products LP Savannah River Mill and Georgia Power Company Plant McIntosh as sources for which SO_2 air quality must be characterized under the DRR. In response to Georgia EPD's request dated February 12, 2016, Georgia-Pacific and Georgia Power are providing the enclosed air quality modeling protocol to describe the proposed dispersion modeling techniques and data resources that will be used to characterize SO_2 air quality in Effingham County.

Please contact Mr. Pavankumar Sonwane of GP at pavankumar.sonwane@gapac.com or 404-652-4709 or to discuss questions and comments about this air quality modeling protocol.

Sincerely,

Ryan A. Gesser, CCM
Air Quality Manager

Enclosure

cc: Dr. Maria Zufall (Georgia-Pacific, Atlanta)
Mr. Pavankumar Sonwane (Georgia-Pacific, Atlanta)
Ms. Mary Hoffman (Georgia-Pacific Savannah River Mill, Rincon)
Mr. Jonathan Bandzul (Georgia Power, Atlanta)

1-hour Sulfur Dioxide National Ambient Air Quality Standards Attainment Demonstration

Dispersion Modeling Protocol

Georgia-Pacific Consumer Products LP – Savannah River Mill and Georgia Power Company Plant McIntosh

March 30, 2016

Contents

List of Appendices

1.0 Introduction

1.1 Overview

In 2010 U.S. EPA promulgated a new 1-hour Sulfur Dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) of 75 parts per billion (ppb). On August 10, 2015, EPA published the1-hour SO_2 NAAQS Data Requirements Rule (DRR) that requires state regulatory agencies, including the Georgia Environmental Protection Division (EPD), to characterize SO_2 air quality in areas not designated as "nonattainment." The DRR affects SO_2 emitting sources with actual emissions of 2,000 tons per year or greater. SO_2 air quality near facilities will be characterized by either dispersion modeling or ambient SO_2 monitoring to designate the area as attainment or nonattainment relative to the 1-hour SO_2 NAAQS.

Georgia-Pacific Consumer Products LP (GP) - Savannah River Mill (SRM) and Georgia Power McIntosh Steam-Electric Generating Plant (Plant McIntosh) are affected sources under the DRR because SRM and Plant McIntosh actually emitted more than 2,000 tons SO_2 in 2014. SRM and Plant McIntosh notified Georgia EPD that the facilities have selected the air quality modeling option using three years (2012-2014) of actual SO_2 emissions to characterize air quality relative to the 2010 1-hour SO_2 NAAQS. GP and Georgia Power are submitting this modeling protocol to the Georgia EPD for review in response to a request dated February 12, 2016.

1.2 Applicable Regulations and Guidance

The analyses described in this dispersion modeling protocol will be conducted in a manner generally conforms to the following EPA regulations and guidance documents.

- 40 CFR Part 51, Subpart BB: Data Requirements Rule for the 2010 1-Hour Sulfur Dioxide (SO_2) Primary National Ambient Air Quality Standard (NAAQS)
- "SO_2 NAAQS Designations Modeling Technical Assistance Document (TAD)", Revised February 2016
- Guideline on Air Quality Models – 40 CFR Part 51, Appendix W, Revised November 9, 2005
- "AERMOD Implementation Guide", Revised August 3, 2015
- "Georgia Air Dispersion Modeling Guidance", Revised April 23, 2012

2.0 Modeled Sources

This section provides the description of the sources to be simulated in the dispersion modeling analysis that will be conducted to meet the DRR for the 2010 1-hour SO_2 NAAQS.

2.1 Savannah River Mill

GP owns and operates a recycle, deinking, and bleaching paper mill (the Savannah River Mill, or SRM) in Rincon, Effingham County, Georgia. Figure 2-1 shows the location and Figure 2-2 provides a near-field aerial view of the SRM.

The primary operations at the SRM are pulp and bleaching operations, paper machines, converting and printing operation, and additional operations and equipment necessary to support these operations including three power boilers (B001 – Boiler No. 3, B002 – Boiler No. 4, and B003 – Boiler No. 5). Boiler Nos. 3 and 5 are circulating fluidized bed boilers and Boiler No. 4 is a bubbling fluidized bed boiler. Each boiler is equipped with a baghouse to control particulate matter (PM) emissions and a limestone injection system to control SO_2 emissions. Each boiler (B001-B003) exhausts to a dedicated 381-ft stack with an inner diameter of 7.25 ft. The actual hourly emissions, temperatures, and flow rates for the recent three calendar years (2012-2014) will be modeled. Emission rate, temperature, and flow rates for each hour were recorded using continuous emissions monitoring systems (CEMS). Figure 2-3 shows the hourly SO_2 emission rates that will be modeled through each stack.

GP analyzed hourly CEMS data to quantify the SO_2 emission rate from each boiler (B001-B003) for each hour of the 3-year period. The CEMS operates by measuring the volumetric SO_2 concentration in the exhaust gas (i.e., parts per million [ppm] by volume) and the flow rate in the standard cubic feet per hour (scfh).

Sample calculations are presented below for April 7, 2013 Hour 1 for the Boiler No. 5 (B003), using the conversion procedures listed in 40 CFR Part 75, Appendix F.

$E_h = KC_hQ_h$, where,

E_h = Hourly SO_2 mass emission rate during unit operation (lb/hr)
$K = 1.66 \times 10^{-7}$ lb/ppm-scf
C_h = Hourly average SO_2 concentration (ppm) during unit operation, stack moisture basis
Q_h= Hourly average volumetric flow rate (scfh) during unit operation, stack moisture basis

$E_h = 1.66 \times 10^{-7} \times 280.5 \text{ ppm} \times 5{,}496{,}000 \text{ scfh} = 255.91$ lb/hr

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The SRM also operates other miscellaneous sources that emit SO_2 as listed in Table 2-1. These emission sources will be modeled at their maximum hourly SO_2 emission rate and representative stack parameters. These emissions units have considerably lower SO_2 emission rates than the boilers and can be reasonably and conservatively represented using a continuous, maximum emission rate. This approach is consistent with the SO_2 Modeling TAD, which in Section 5.4 explains, "States may find that use of allowable or PTE emissions is simpler and may show that an area would attain the standard with those conservative assumptions."

Table 2-1. Modeled Emission Parameters for Miscellaneous Sources – Savannah River Mill

Modeled Stack ID	Stack Deascription	East (m)	North (m)	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (^{0}F)	SO_2 (lb/hr)
SCT1	CT COMMONSTK#1 (WH01 AND CT-01 EMISSIONS)	481039.37	3577380.62	165	12.00	77.8	500.0	19.05
SCT2	CT COMMONSTK#2 (WH02 AND CT-02 EMISSIONS)	481051.66	3577391.86	165	12.00	68.8	500.0	20.40
EP45	YANKEE WET END EXHAUST, PM # 16 (PM01)-BURNERS	480887.76	3577315.82	94	7.00	36.0	192.0	0.02
EP56	YANKEE DRY END EXHAUST, PM # 16 (PM01)-BURNERS	480913.21	3577286.86	94	7.00	41.8	200.0	0.02
EP66	YANKEE WET END EXHAUST, PM # 17 (PM02)-BURNERS	480931.43	3577356.04	94	6.25	36.5	478.0	0.02
EP67	YANKEE DRY END EXHAUST, PM # 17 (PM02)-BURNERS	480952.62	3577335.17	94	6.25	36.5	478.0	0.02
EP03	YANKEE WET END EXHAUST, PM # 18 (PM03)-BURNERS	480979.90	3577390.91	84	7.00	42.8	192.0	1.74
EP14	YANKEE DRY END EXHAUST, PM # 18 (PM03)-BURNERS	481005.12	3577361.89	84	7.00	42.6	194.0	1.74
EP24	YANKEE WET END EXHAUST, PM # 19 (PM04)-BURNERS	480843.47	3577272.61	84	7.00	37.1	220.0	0.01
EP37	YANKEE DRY END EXHAUST, PM # 19 (PM04)-BURNERS	480867.44	3577242.42	84	7.00	42.9	238.0	0.01
EP28	YANKEE WET END EXHAUST, PM # 20 (PM05)-BURNERS	480774.73	3577254.27	94	4.75	129.7	268.0	0.02
EP30	YANKEE DRY END EXHAUST, PM # 20 (PM05)-BURNERS	480800.72	3577220.48	94	4.75	129.7	270.0	0.02
FP12	Landfill Flare	481573.55	3575325.61	34	0.82	190.0	1400.7	3.45

The remaining sources of SO_2 emissions at the Savannah Mill are the diesel-fired auxiliary and firewater pump engines are maintained for emergency purposes and are not operated simultaneously as part of normal facility operations except for intermittent, periodic testing for short, finite periods. GP believes these sources can be reasonably excluded from the modeling analysis.

Figure 2-1. Location of the Savannah River Mill

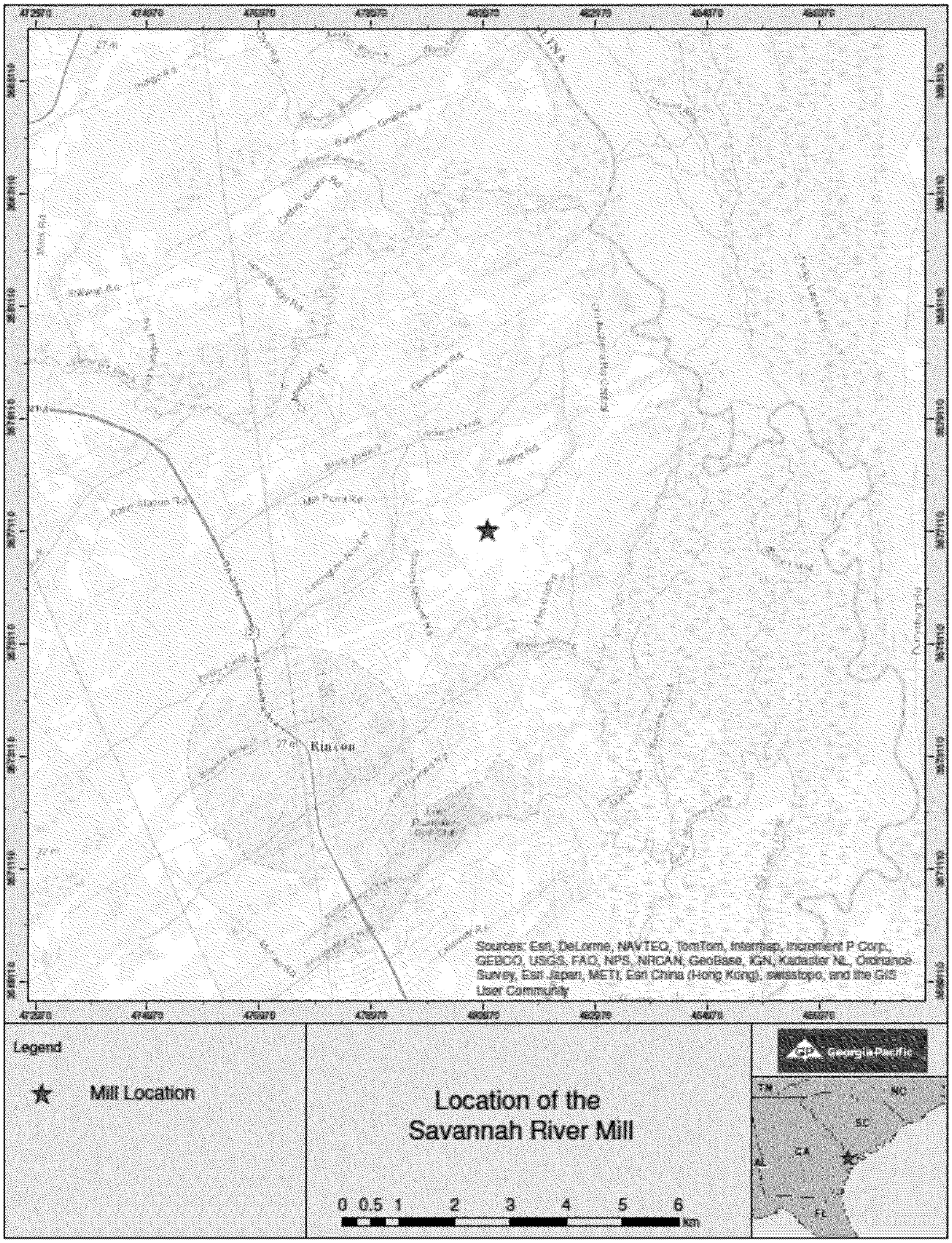

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Figure 2-2. Aerial View of the Savannah River Mill

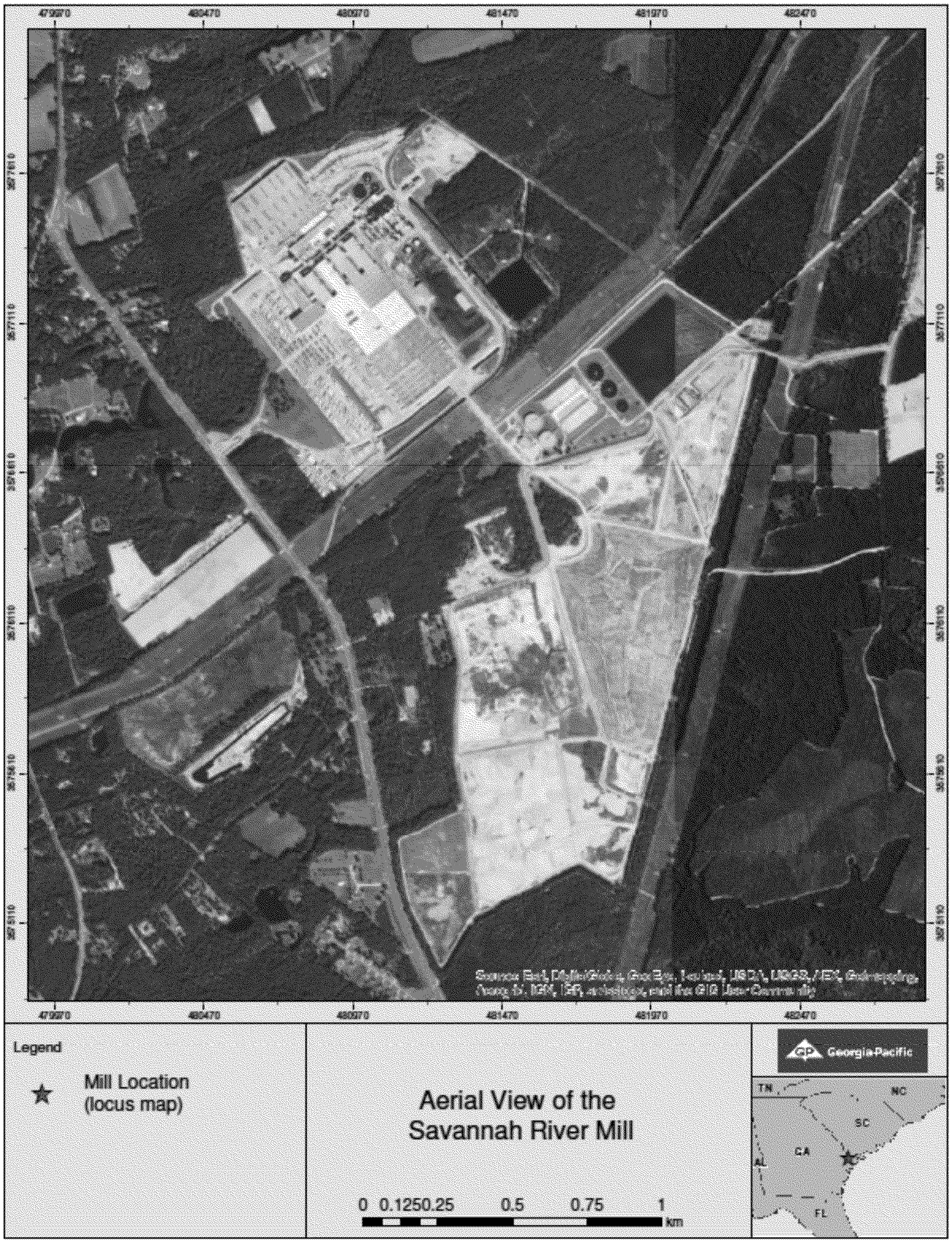
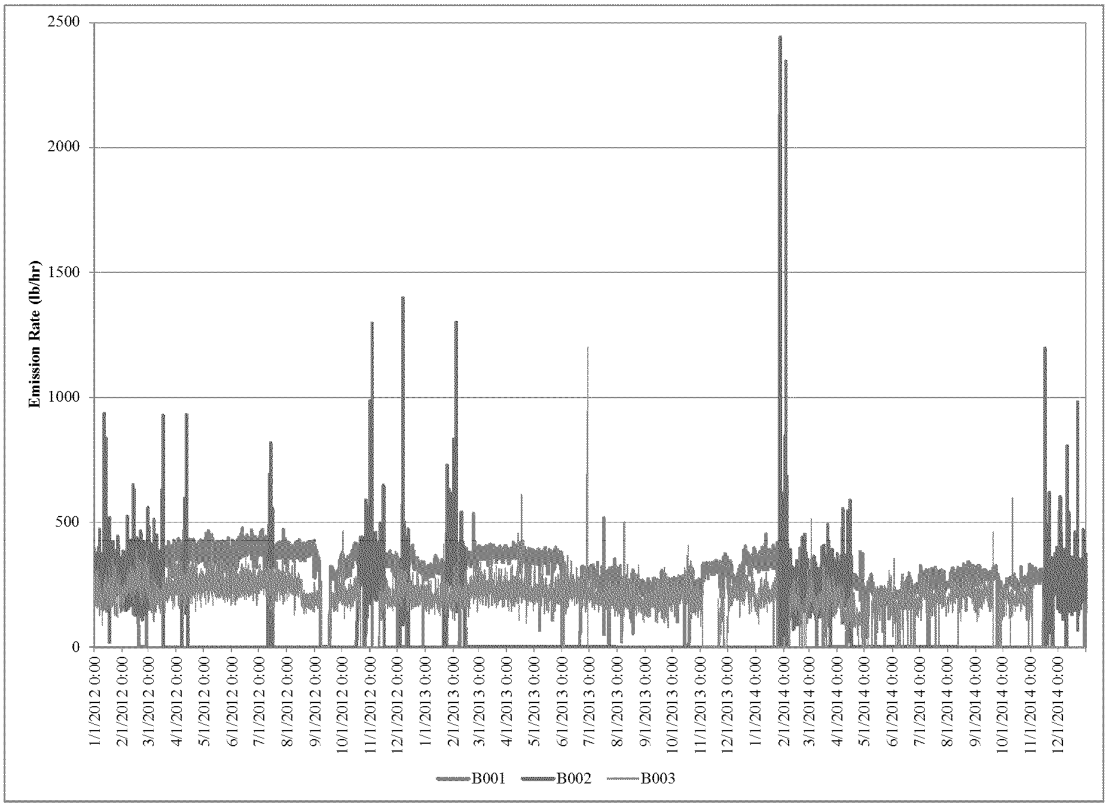


Figure 2-3. Hourly (2012-2014) SO_2 Emission Rates



2.2 Plant McIntosh

Based on discussion with Georgia EPD on June 12, 2014, the modeling analysis will also include Georgia Power's Plant McIntosh actual SO_2 emissions in 2012, 2013, and 2014. The location of the Plant McIntosh relative to the SRM is shown in Figure 2-4.

Plant McIntosh is an electric power generation plant including one steam electric generating unit (SG01) which primarily burns coal and eight simple cycle combustion turbines (CT1-CT8) which primarily burn natural gas. Ultra low sulfur diesel (ULSD) fuel is used as a startup fuel for the steam generating unit and as a backup fuel for the combustion turbines. The steam generating unit exhausts through one 400-ft stack, and each combustion turbine has its own stack which is 64 foot tall.

The McIntosh Combined-Cycle facility includes two combined-cycle power blocks. Each combined-cycle power block includes two combustion turbines (10A-B & 11A-B) each with a supplementally fired (duct burner) heat recovery steam generator (HRSG). Each combustion turbine fires natural gas (primary) and ULSD (backup). Each duct burner fires natural gas exclusively. Each combustion turbine is equipped with an evaporative inlet cooler and lube oil demister vents. The emissions from each combustion turbine exhausts through its own 160 foot stack.

For steam electric generating unit (SG01), the actual hourly emissions, temperatures, and flow rates for the recent three calendar years (2012-2014) will be modeled. Emission and flow rates for each hour were reported to EPA Clean Air Markets Division (CAMD) under the Acid Rain Program using CEMS certified according to 40 CFR Part 75. Figure 2-5 shows the hourly SO_2 emission rates that will be modeled in 2012, 2013, and 2014.

The modeled emission parameters for the simple cycle combustion turbines (CT1-CT8) and the combined cycle combustion turbines (10A-B & 11A-B) with duct burners to be included in the modeling analysis are listed in Table 2-2. The SO_2 emissions for the simple cycle combustion turbines (CT1-CT8) are based on 15 ppm ULSD combustion and for the combined cycle combustion turbines (10A-B&11A-B) are based on an emission rate of 0.0006 lb/MMBtu, including the heat input from the duct burners.

Figure 2-4. Location of the Plant McIntosh Relative to the Savannah River Mill

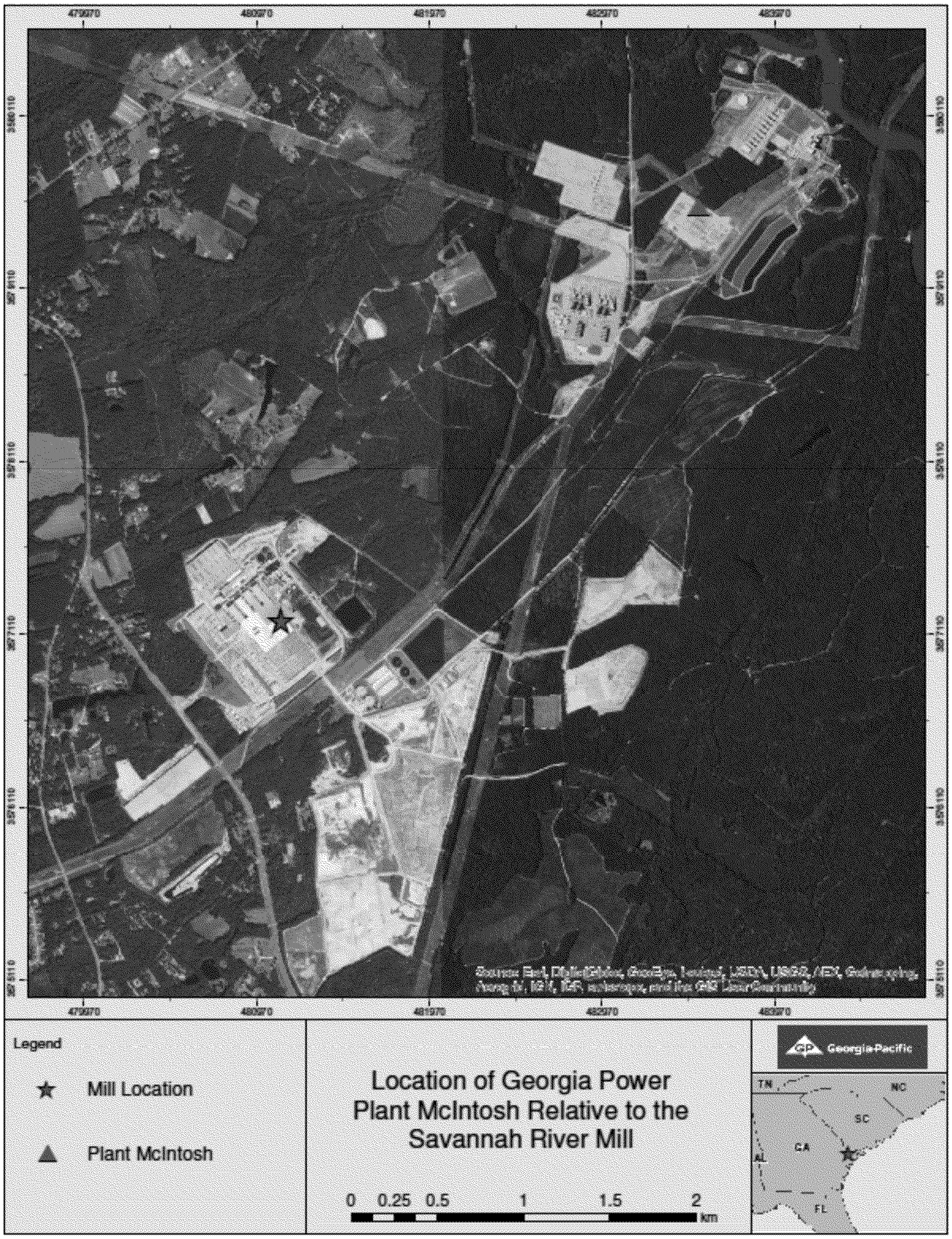


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Figure 2-5. Hourly (2012-2014) SO_2 Emission Rates for steam electric generating unit (SG01)

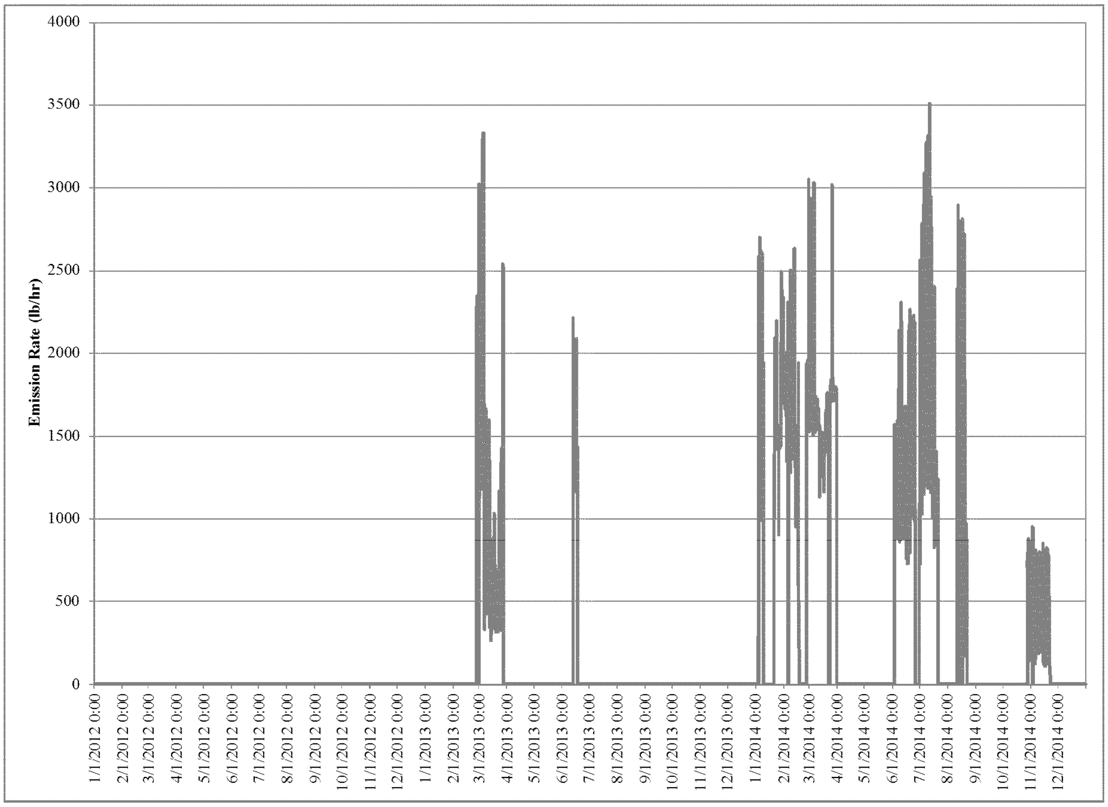

Table 2-2. Modeled Emission Parameters for Combustion Turbines – Plant McIntosh

Steam Plant CTs							
	East (m)	North (m)	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (°F)	SO_2 (lb/hr)
CT1	483974	3580104	64	15.5	134.5	984	1.93
CT2	483956	3580079	64	15.5	134.5	984	1.93
CT3	483938	3580055	64	15.5	134.5	984	1.93
CT4	483920	3580030	64	15.5	134.5	984	1.93
CT5	483902	3580005	64	15.5	134.5	984	1.93
CT6	483884	3579981	64	15.5	134.5	984	1.93
CT7	483866	3579956	64	15.5	134.5	984	1.93
CT8	483848	3579932	64	15.5	134.5	984	1.93
Combined-Cycle w/Duct Burner							
	East (m)	North (m)	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (°F)	SO_2 (lb/hr)
10A	482833	3578983	160	19	51.2	167	1.47
10B	482797	3578990	160	19	51.2	167	1.47
11A	482978	3578954	160	19	51.2	167	1.47
11B	482942	3578961	160	19	51.2	167	1.47

2.3 Nearby Sources

There are two generating power plants (Effingham County Power, LLC in Georgia and Jasper Generating Station in South Carolina) within 10 km of SRM and Plant McIntosh. These sources will be modeled at the potential SO_2 emission rates. The modeled emission parameters for the SO_2 emission sources at the Effingham County Power, LLC and the Jasper Generating facility to be included in the modeling analysis are listed in Tables 2-3 and 2-4 respectively. The modeled emission parameters for the Effingham County Power, LLC were obtained from the Georgia EPD permit database and the Jasper Generating facility data was provided by Mr. John Glass with South Carolina Department of Health and Environmental Control (DHEC).

Table 2-3. Modeled Emission Parameters – Effingham County Power, LLC

Modeled Stack ID	Stack Deascription	East(m)	North(m)	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (^{0}F)	SO_2 (lb/hr)
ECT1	Combustion Turbine #1	473185	3571202	165	19.0	43.9	185	0.59
ECT2	Combustion Turbine #2	473216	3571239	165	19.0	43.9	185	0.59
ECT3DB3	Combustion Turbine #3	473281	3571262	165	19.0	61.3	202	3.90
ECT3DB4	Combustion Turbine #4	473281	3571262	165	19.0	61.3	202	3.90
AUX1	AuxiliaryBoiler #1	473218	3571240	39.1	2.60	18.1	476	0.02
AUX2	AuxiliaryBoiler #2	473281	3571262	39.1	2.60	18.1	476	0.02

Table 2-4. Modeled Emission Parameters – Jasper Generating Facility

Modeled Stack ID	Stack Deascription	East(m)	North(m)	Height (ft)	Diameter (ft)	Velocity (fps)	Temp (^{0}F)	SO_2 (lb/hr)
ECT1	Combustion Turbine #1	488328.76	3580242.58	190	18	72.6	278	106.5
ECT2	Combustion Turbine #2	488371.38	3580243.66	190	18	72.6	278	106.5
ECT3	Combustion Turbine #3	488414.95	3580242.54	190	18	72.6	278	106.5

3.0 Dispersion Modeling Analysis

3.1 Modeling Procedures

3.1.1 Model Selection

The modeling analysis will be performed using the latest regulatory version (15181) of EPA's American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD). AERMOD is a steady-state plume dispersion model that is recommended by EPA's *Guideline on Air Quality Models*[1]. The modeling analysis using AERMOD will utilize the regulatory default mode in determining concentrations at all receptors as discussed in section 3.2.1.

3.1.2 Building Downwash

The SO_2 Modeling TAD specifies that for the purposes of modeling with actual emissions to characterize air quality for use in a future SO_2 designations process, the EPA recommends the use of actual stack heights so that the modeling analysis can most closely represent the actual ambient air quality conditions as influenced by the source. If modeling with allowable emissions, however, the "Good Engineering Practice" ("GEP") stack policy should be used in the model.

GP will use actual stack heights for the SO_2 emission sources at SRM and Plant McIntosh modeled with actual emissions. Miscellaneous sources at SRM listed in Table 2-1 and nearby sources that are modeled with the allowable emission rates will be evaluated to determine the maximum creditable GEP stack height.

A GEP stack height analysis will be performed for all point/stack sources included in the modeling in accordance with US EPA's guidelines (US EPA, 1985). Per the guidelines, the physical GEP height ("H_{GEP}") is determined from the dimensions of all buildings that are within the region of influence using the following equation:

$H_{GEP} = H + 1.5L$, where:

H = height of the structure within 5L of the stack which maximizes H_{GEP}, and
L = lesser dimension (height or projected width) of the structure.

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[1] *Revisions to the Guideline on Air Quality Models: Adoption of a Preferred General Purpose (Flat and Complex Terrain) Dispersion Model and Other Revisions, 40 CFR Part 51, November 9, 2005.*

For a squat structure (*i.e.,* height less than projected width), the formula reduces to:

$$H_{GEP} = 2.5H$$

Wind direction-specific building dimensions and downwash parameters for input to AERMOD will be developed with the PRIME version of US EPA's Building Profile Input Program (BPIP-PRIME Version 04274). BPIP-PRIME input and output data will be provided on the modeling archive CD provided with the modeling report.

3.1.3 Dispersion Environment

EPA Modeling Guidelines recommend the use of the Auer scheme in which the land use within a three kilometer (3 km) area is evaluated to determine the dispersion environment surrounding the site.

As shown in Figure 3-1, the satellite imagery of the 3-km area surrounding the SRM indicates the area is predominantly rural. Therefore, AERMOD will be run using default dispersion algorithms and the urban dispersion option will not be enabled.

3.2 Meteorological Data

Because site-specific meteorological data are not available, the hourly meteorological data from the Savannah/Hilton Head International Airport located in Savannah, Georgia (surface) and the Charleston International Airport, South Carolina (upper air) National Weather Service stations for the period of 2012-2014 will be used in the modeling analysis. Georgia EPD pre-processed these data using current regulatory versions of AERMET (15181), AERSURFACE (13016), and AERMINUTE (15272) and makes them available on the EPD website. The surface elevation of 15.5 meters will be used in AERMOD. The locations of the Savannah International Airport and Charleston International Airport relative to the SRM are shown in Figure 3-2.

Although the Savannah/Hilton Head International Airport is designated as representative data for facilities in Effingham County, a demonstration must be made to show that the meteorological data from the Savannah/Hilton Head International Airport is representative of the SRM. In addition to being representative, the data must meet quality and completeness requirements per EPA guidelines. Surface observations from the Savannah/Hilton Head International Airport are presumptively representative of conditions in the vicinity of the SRM because of the short distance (approximately 14 miles or 23 km) separating the two locations and flat terrain characteristics of the Atlantic seaboard. A more extensive discussion of the data representativeness is provided in Appendix A.

3.2.1 Model Receptor Grid

A comprehensive Cartesian receptor grid, extending approximately 20 km from the SRM will be used in the AERMOD modeling analyses to assess maximum ground-level SO_2 concentrations. The Cartesian receptors grid will consist of the following receptor spacing:

- From the ambient air boundaries surrounding SRM and Plant McIntosh to a distance of 5,000 meters (m) at 100-m intervals
- Beyond 5,000 m to 10,000 m at 500-m intervals
- Beyond 10,000 m to 20,000 m at 1000-m intervals

Fine grid receptors will be used where necessary in the areas of maximum impacts determined with the initial receptor grid if the maximum impacts are not modeled in areas where receptors are already spaced at 100 m. Receptors will also be placed at 100 m intervals along the ambient air boundary (fenceline) of SRM, Plant McIntosh, Effingham County Power, LLC, and Jasper Generating facility. The receptors within SRM, Plant McIntosh, Effingham County Power, LLC, and Jasper Generating facility ambient air boundary were excluded from the modeling analysis. Although the SO_2 Modeling TAD specifies that receptors need not be placed at locations where it is not feasible to place a monitor (e.g., water bodies and within facility property lines), the proposed receptor grid conservatively simulates all areas beyond the facility's ambient air boundary.

Terrain elevations from the National Elevation Dataset (NED) acquired from USGS[2] will be processed with AERMAP (version 11103) to develop the receptor terrain elevations. All receptor locations will be represented in the Universal Transverse Mercator projection (UTM), Zone 17, North American Datum 1983. The NED file(s) will be included in the modeling archive CD that will be submitted along with the modeling report.

Near-field and far-field views of the receptor locations are shown in Figures 3-3 and 3-4, respectively.

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[2] http://www.mrlc.gov/viewerjs

Figure 3-1 Land Use within 3 km of the Savannah River Mill

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Figure 3-2 Location of the Meteorological Data Observation Sites Relative to the Savannah River Mill

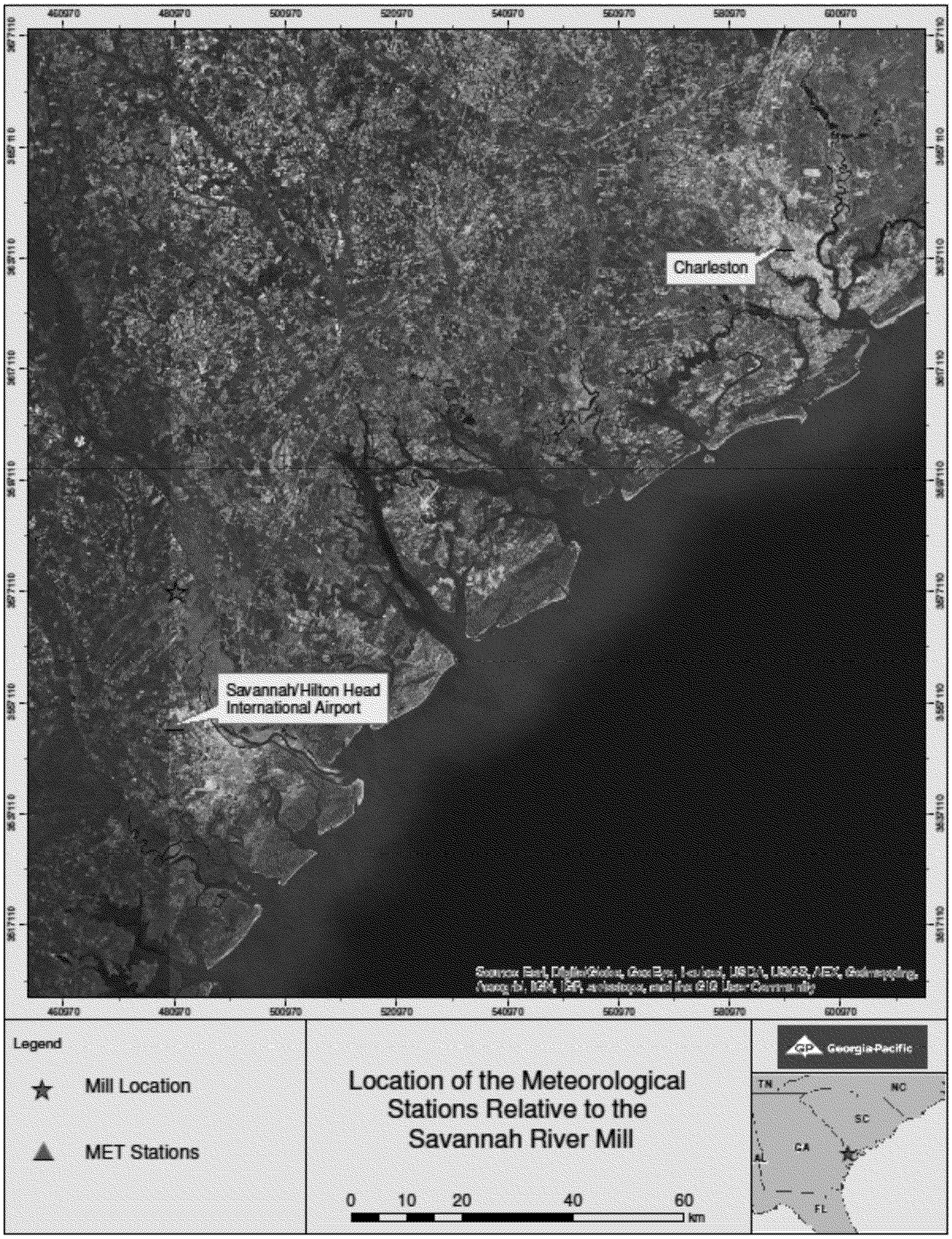


Figure 3-3 Near-Field View of the Receptor Grid

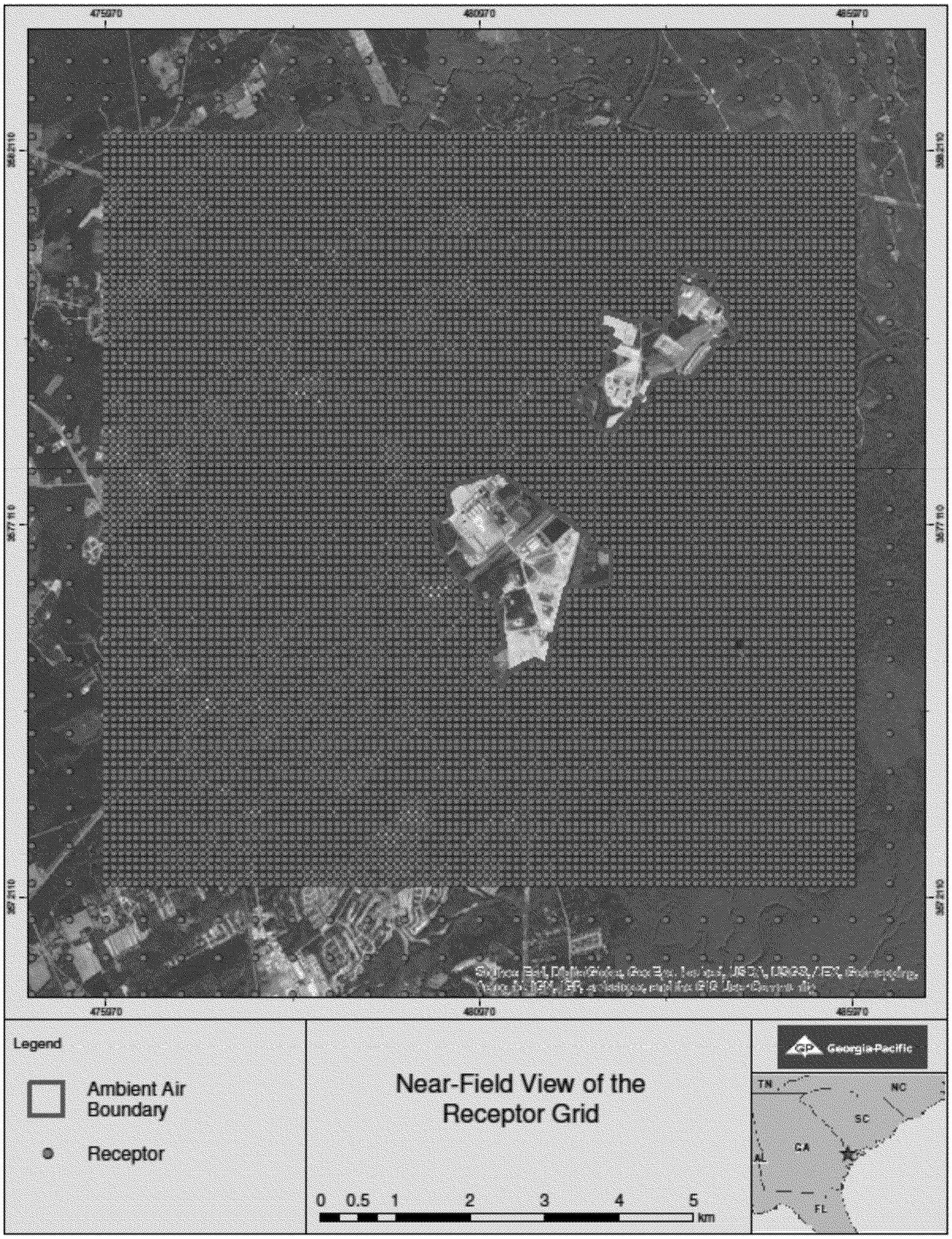
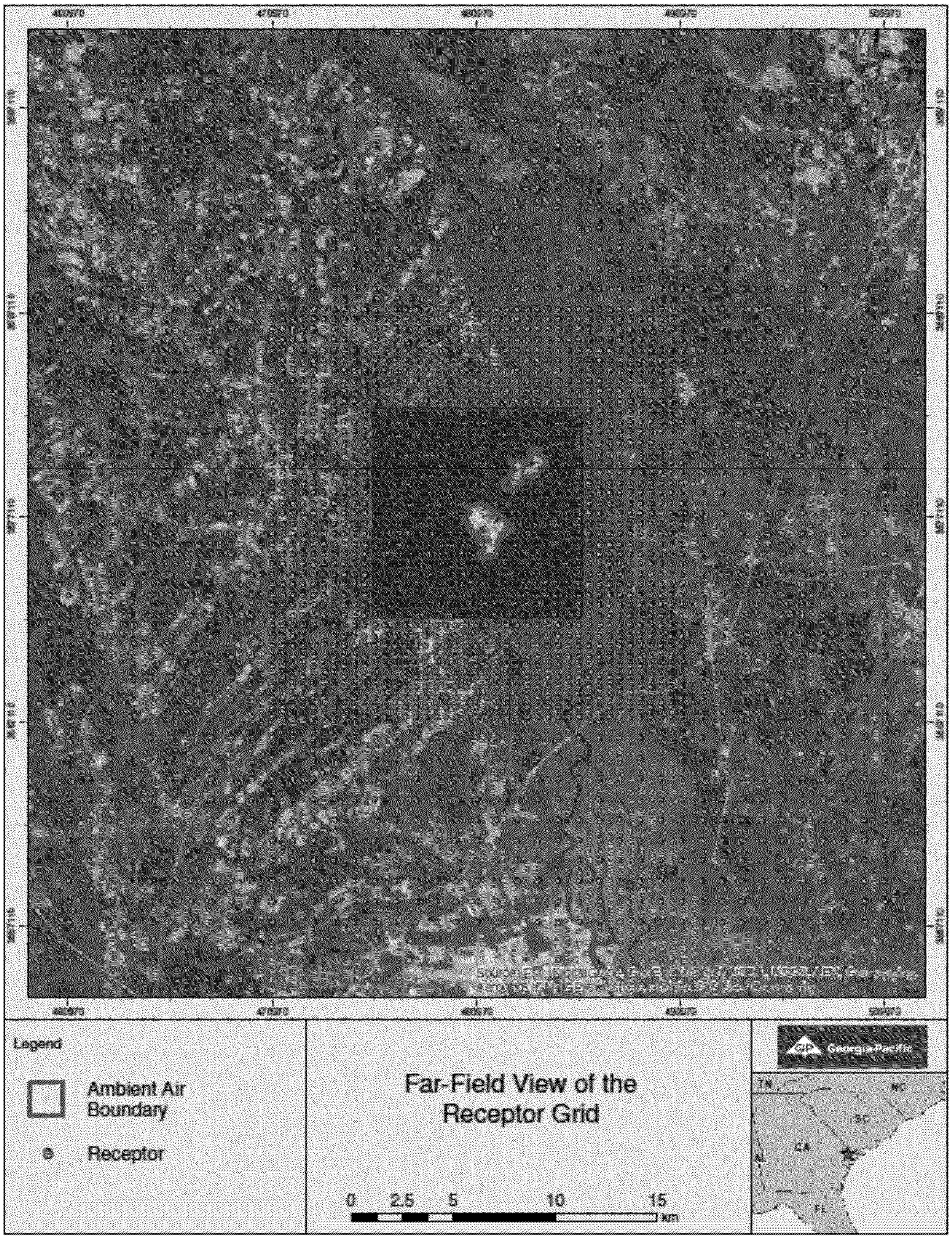


Figure 3-4 Far-Field View of the Receptor Grid



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3.3 Background Concentration

A representative ambient background concentration will be added to modeled concentrations to assess compliance with the 1-hour SO_2 NAAQS. The 1-hour SO_2 background concentration of 13.1 µg/m^3 (5 ppb) was provided by Georgia EPD during the meeting with GP on June 12, 2014. The total SO_2 concentrations will be calculated as the sum of the modeled design concentration from the Savannah River Mill, Plant McIntosh, Effingham County Power, LLC, Jasper Generating facility, and the ambient background concentration.

3.4 Modeled Design Concentration

The modeled design concentration will be calculated by AERMOD (version 15181) using actual hourly emissions from 2012-2014 and will reflect the three-year average of the 99^{th} percentile ranked daily maximum 1-hour SO_2 concentration. The sum of the modeled design concentration and representative background concentration will be compared to the 1-hour NAAQS to demonstrate attainment.

3.5 Data Submittal

Upon completion of modeling, GP will submit to Georgia EPD in electronic format all model runs, building downwash analysis, and meteorological data used in this modeling. A scaled plot plan of the facility, building heights and dimensions, and all relevant stack parameters will be included.

Appendix A

Land Use Analysis

Appendix A Land Use Analysis

Although the Savannah/Hilton Head International Airport is designated as the appropriate data for facilities in Effingham County, a demonstration must be made to show that the meteorological data from the Savannah/Hilton Head International Airport is representative of the Savannah River Mill. The AERMOD Implementation Guide (AIG)[3] specifies that the determination of representativeness of meteorological data depends on a comparison of surface characteristics; specifically the surface roughness (z_0), albedo (r) and the Bowen ratio (Bo), between the monitoring site and the project site. Therefore, a comparison of the surface characteristics of the Savannah/Hilton Head International Airport and the Savannah River Mill was conducted. Surface characteristics for the Savannah/Hilton Head International Airport were provided by GA EPD. Surface characteristics for the Savannah River Mill were determined by the following procedure.

The revised AIG provides the following recommendations for determining the site characteristics:

1. The determination of the surface roughness length should be based on an inverse distance weighted geometric mean for a default upwind distance of 1 kilometer relative to the measurement site. Surface roughness length may be varied by sector to account for variations in land cover near the measurement site; however, the sector widths should be no smaller than 30 degrees. As discussed further below, 12 sectors were used in this application.
2. The determination of the Bowen ratio should be based on a simple unweighted geometric mean (*i.e.,* no direction or distance dependency) for a representative domain, with a default domain defined by a 10 km-by-10 km region centered on the measurement site.
3. The determination of the albedo should be based on a simple unweighted arithmetic mean (*i.e.,* no direction or distance dependency) for the same representative domain as defined for Bowen ratio, with a default domain defined by a 10 km-by-10 km region centered on the measurement site.

The AIG recommends that the surface characteristics be determined using an EPA developed tool called AERSURFACE. AERSURFACE uses digital land cover data from the USGS National Land Cover Data 1992 archives (NLCD92) coupled with user inputs of

[3] US EPA, "AERMOD Implementation Guide", Revised August 3, 2015

seasonal surface characteristics and annual surface moisture categories (wet, dry or average) to calculate surface characteristics.

The current version of AERSURFACE (Version 13016) supports the use of land cover data from the USGS National Land Cover Data 1992 archives (NLCD92). The NLCD92 archive provides data at a spatial resolution of 30 meters based on a 21-category classification scheme applied over the continental U.S. Visual inspection of recent satellite images in the area of the Savannah River Mill and the Savannah/Hilton Head International Airport (shown in Figures A-1 and A-2 respectively), compared to the 1992 land cover images (shown in Figures A-3 and A-4), indicate that there have been no significant changes in land use cover confirming the use of the 1992 data is reasonable. Figures A-5 and A-6 show the near-field view of the 1-m radius circle, with the 12 land use sectors surrounding the Savannah River Mill and Savannah/Hilton Head International Airport. For the surface roughness length comparison, the 1-km area surrounding the Savannah River Mill was divided into 12 sectors.

In AERSURFACE, the various land cover categories are linked to a set of seasonal surface characteristics. As such, AERSURFACE requires specification of the seasonal category for each month of the year. The following five seasonal categories are offered by AERSURFACE:

1. Midsummer with lush vegetation.
2. Autumn with unharvested cropland.
3. Late autumn after frost and harvest, or winter with no snow.
4. Winter with continuous snow on ground.
5. Transitional spring with partial green coverage or short annuals.

The AERSURFACE seasonal designations were provided in the AersurfaceRemote document (AersurfaceRemote.dat) that accompanied the meteorological data obtained from the Georgia EPD website. Since there were no months with continuous snow cover, seasonal category 4 was not applicable. The monthly designations are summarized in Table A-1.

In addition, for Bowen ratio the land use values are linked to three categories of surface moisture corresponding to average, wet and dry conditions. As with the seasonal designations, the surface moisture conditions were provided in the AersurfaceRemote document that accompanied the meteorological data obtained from the GA EPD website. The surface moisture conditions are summarized in Table A-2.

To quantitatively compare the Savannah/Hilton Head International Airport and the Savannah River Mill, the Albedo, Bowen ratio, and surface roughness land use characteristics generated from AERSUREFACE are provided in Table A-3. As shown in Table A-3, the Albedo and Bowen ratio are relatively similar at both sites, while the overall surface roughness of the Savannah River Mill is 0.17 m and for the Savannah/Hilton Head International Airport is 0.07 m. Characteristic values of surface roughness range from 0.001 m for open water, to 0.2 for herbaceous wetlands, to 0.5 m for low density residential development, to 1.0 m for high density residential development, to 1.3 m for forested areas.[4] The surface roughness values for both sites are characteristics of the common grassland/herbaceous wetlands that surround each location and indicate that surface observations from the Savannah/Hilton Head International Airport are reasonably representative of conditions at the Savannah River Mill.

Table A-1. Seasonal Categories

Category	Season Description	Months
1	Mid-summer with lush vegetation	Jun, Jul, Aug
2	Autumn with un-harvested cropland	Sep ,Oct, Nov
3	Late autumn after frost or winter with no snow cover	Dec, Jan, Feb
4	Winter with continuous snow cover	NA
5	Transitional spring with partial green coverage or short annuals	Mar, Apr, May

Table A-2. Surface Moisture Conditions

Location	2012	2013	2014
Savannah International Airport	Average	Average	Average

[4]AERSURFACE User's Guide. EPA-454/B-08-001, Revised January 16, 2013.

Table A-3. Land Use Characteristics

Season	Sector	Savannah River Mill				Savannah/Hilton Head Airport		
		Albedo (r)	Bowen Ratio (Bo)	Surface Roughness (zo)		Albedo (r)	Bowen Ratio (Bo)	Surface Roughness (zo)
1	1	0.14	0.45	0.166		0.15	0.57	0.023
1	2	0.14	0.45	0.208		0.15	0.57	0.036
1	3	0.14	0.45	0.078		0.15	0.57	0.043
1	4	0.14	0.45	0.035		0.15	0.57	0.064
1	5	0.14	0.45	0.121		0.15	0.57	0.046
1	6	0.14	0.45	0.095		0.15	0.57	0.02
1	7	0.14	0.45	0.169		0.15	0.57	0.153
1	8	0.14	0.45	0.262		0.15	0.57	0.178
1	9	0.14	0.45	0.157		0.15	0.57	0.211
1	10	0.14	0.45	0.224		0.15	0.57	0.093
1	11	0.14	0.45	0.169		0.15	0.57	0.03
1	12	0.14	0.45	0.24		0.15	0.57	0.016
2	1	0.14	0.39	0.199		0.15	0.48	0.029
2	2	0.14	0.39	0.248		0.15	0.48	0.042
2	3	0.14	0.39	0.098		0.15	0.48	0.05
2	4	0.14	0.39	0.04		0.15	0.48	0.073
2	5	0.14	0.39	0.142		0.15	0.48	0.055
2	6	0.14	0.39	0.115		0.15	0.48	0.028
2	7	0.14	0.39	0.197		0.15	0.48	0.192
2	8	0.14	0.39	0.299		0.15	0.48	0.224
2	9	0.14	0.39	0.186		0.15	0.48	0.259
2	10	0.14	0.39	0.262		0.15	0.48	0.122
2	11	0.14	0.39	0.2		0.15	0.48	0.039
2	12	0.14	0.39	0.278		0.15	0.48	0.022
3	1	0.14	0.29	0.249		0.15	0.39	0.041
3	2	0.14	0.29	0.277		0.15	0.39	0.05
3	3	0.14	0.29	0.115		0.15	0.39	0.056
3	4	0.14	0.29	0.043		0.15	0.39	0.079
3	5	0.14	0.29	0.158		0.15	0.39	0.061
3	6	0.14	0.29	0.132		0.15	0.39	0.035
3	7	0.14	0.29	0.219		0.15	0.39	0.208
3	8	0.14	0.29	0.33		0.15	0.39	0.242
3	9	0.14	0.29	0.23		0.15	0.39	0.27
3	10	0.14	0.29	0.284		0.15	0.39	0.138
3	11	0.14	0.29	0.269		0.15	0.39	0.048
3	12	0.14	0.29	0.362		0.15	0.39	0.029
4	1	0.14	0.45	0.233		0.15	0.57	0.036
4	2	0.14	0.45	0.256		0.15	0.57	0.045
4	3	0.14	0.45	0.101		0.15	0.57	0.05
4	4	0.14	0.45	0.04		0.15	0.57	0.073
4	5	0.14	0.45	0.142		0.15	0.57	0.055
4	6	0.14	0.45	0.116		0.15	0.57	0.029
4	7	0.14	0.45	0.199		0.15	0.57	0.192
4	8	0.14	0.45	0.312		0.15	0.57	0.228
4	9	0.14	0.45	0.215		0.15	0.57	0.26
4	10	0.14	0.45	0.266		0.15	0.57	0.124
4	11	0.14	0.45	0.257		0.15	0.57	0.041
4	12	0.14	0.45	0.353		0.15	0.57	0.023
Average=>		**0.14**	**0.39**	**0.17**		**0.15**	**0.50**	**0.07**

Figure A-1. Aerial Photograph of the 10 km x 10 km Area Surrounding the Savannah River Mill

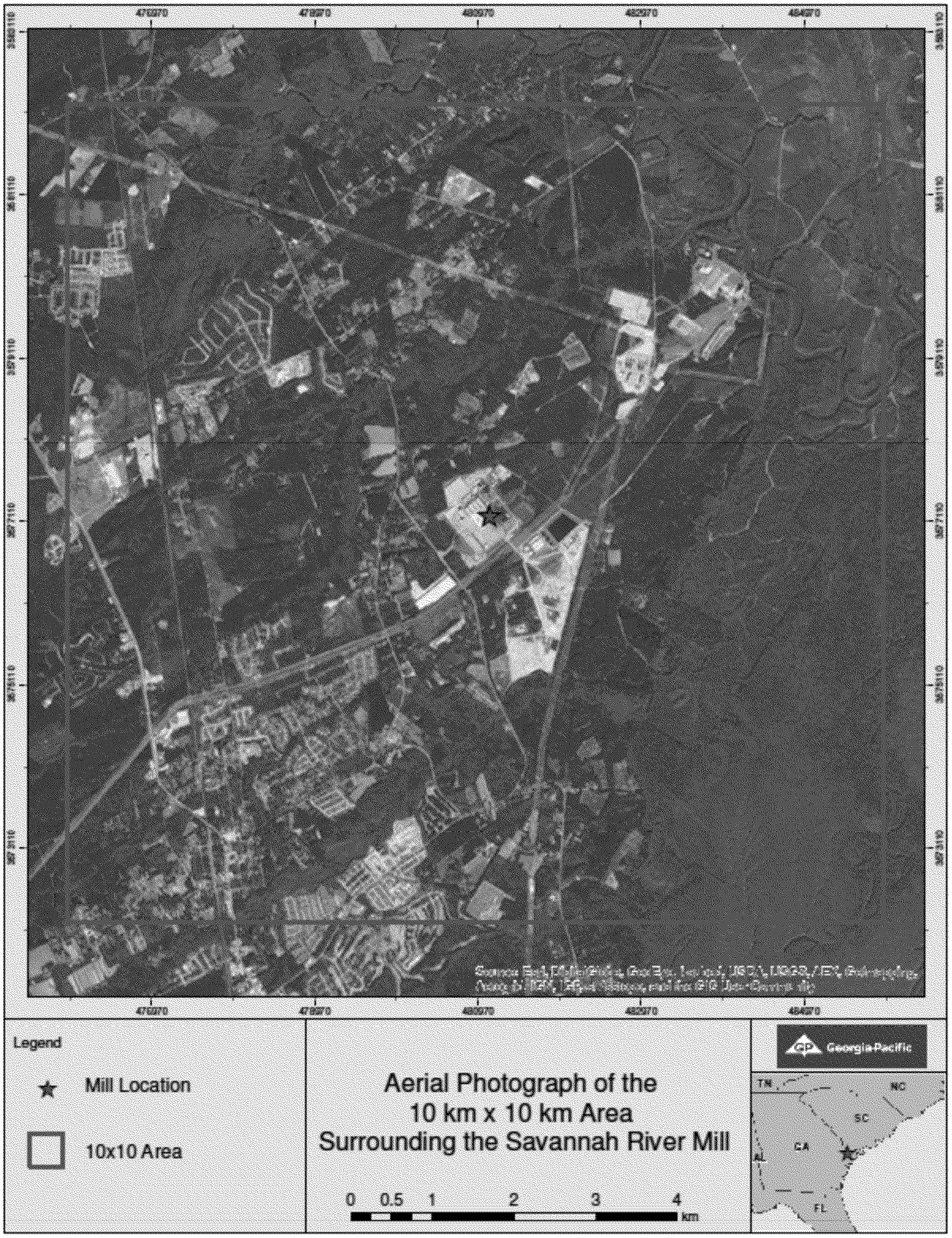

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Figure A-2. Aerial Photograph of the 10 km x 10 km Area Surrounding Savannah/Hilton Head Airport

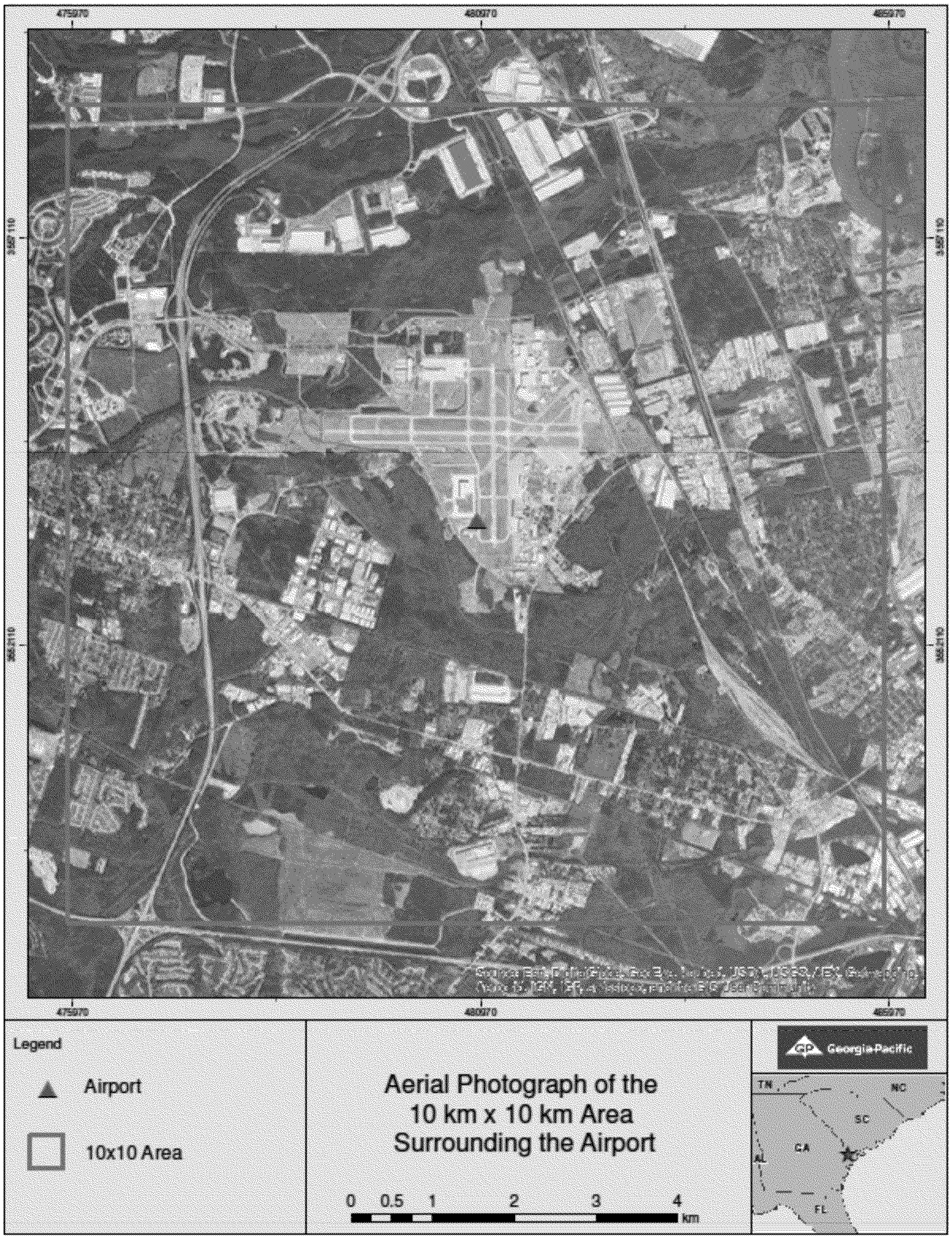

Figure A-3. 1992 NLCD Data for the 10 km x 10 km Area Surrounding the Savannah River Mill

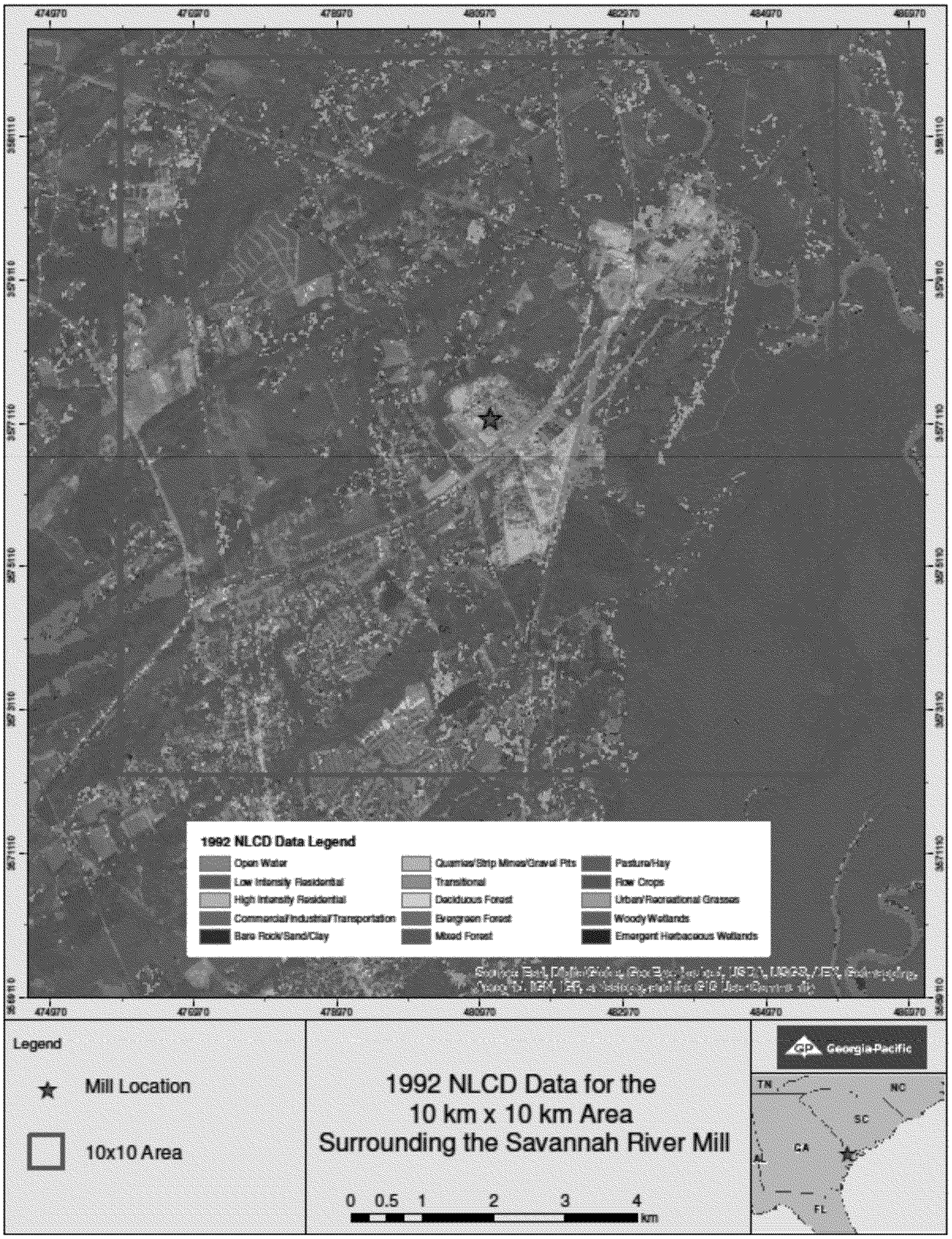

Figure A-4. 1992 NLCD Data for the 10 km x 10 km Area Surrounding Savannah/Hilton Head Airport

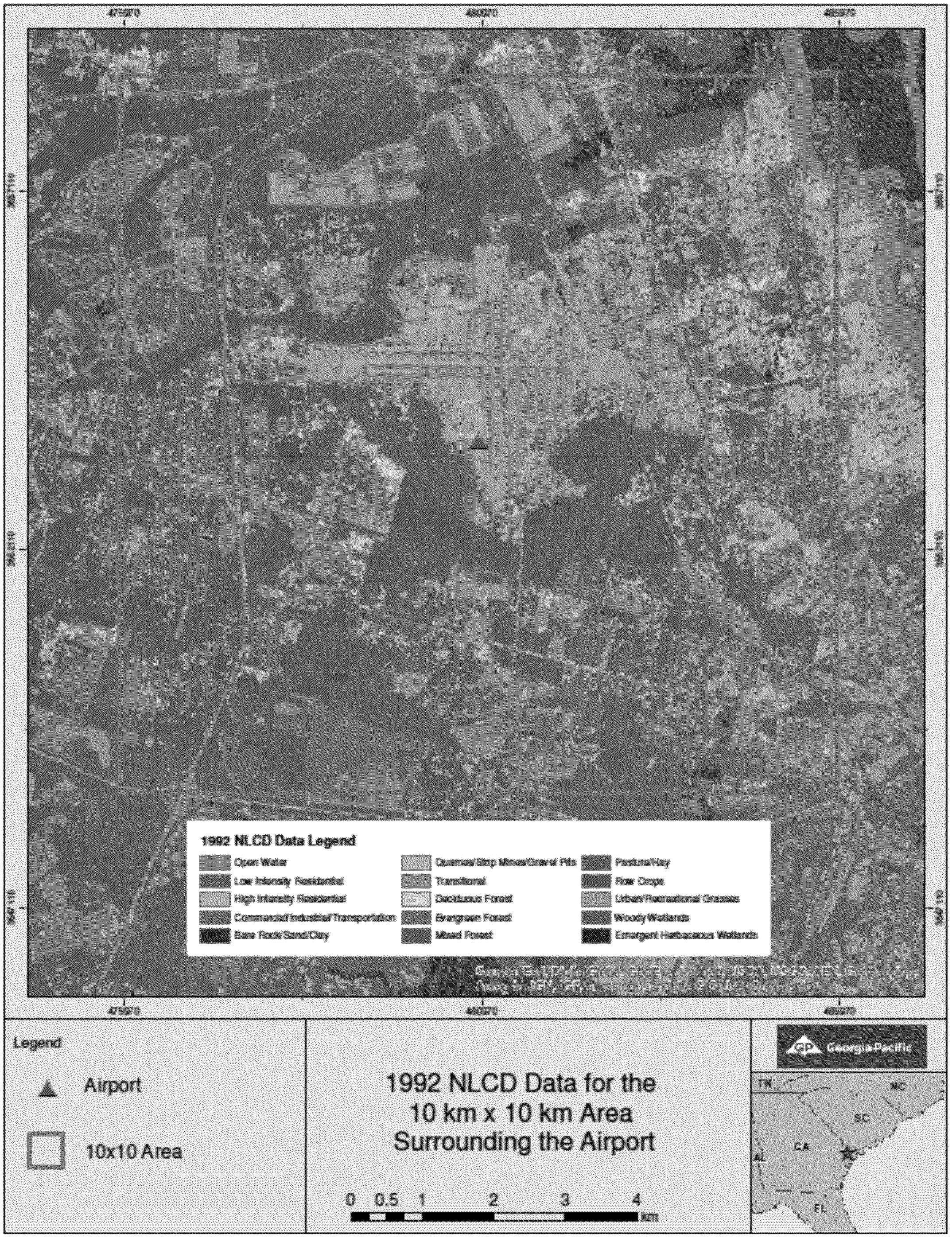

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Figure A-5. Near-Field View of the 1992 NLCD Data for the Area Surrounding the Savannah River Mill

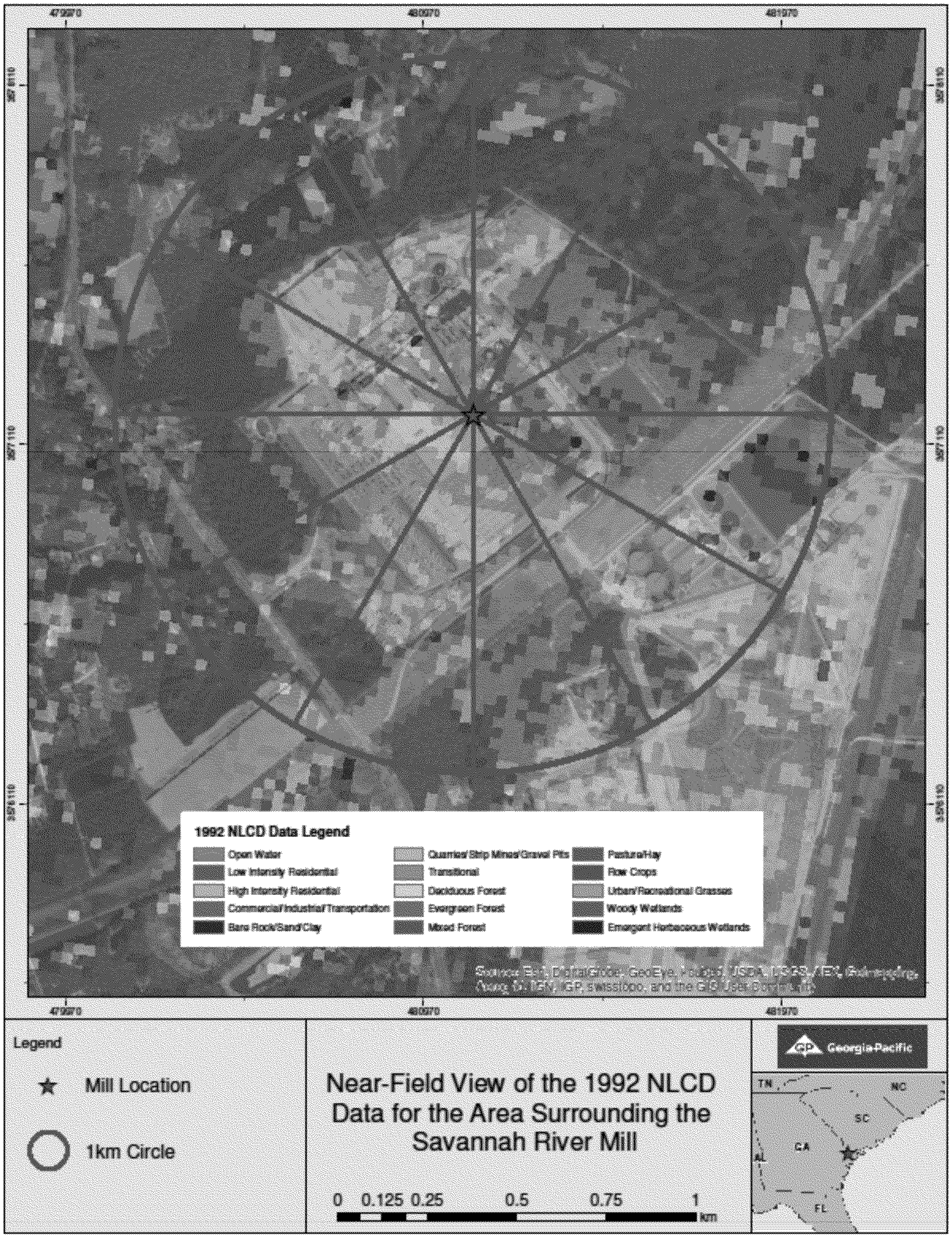

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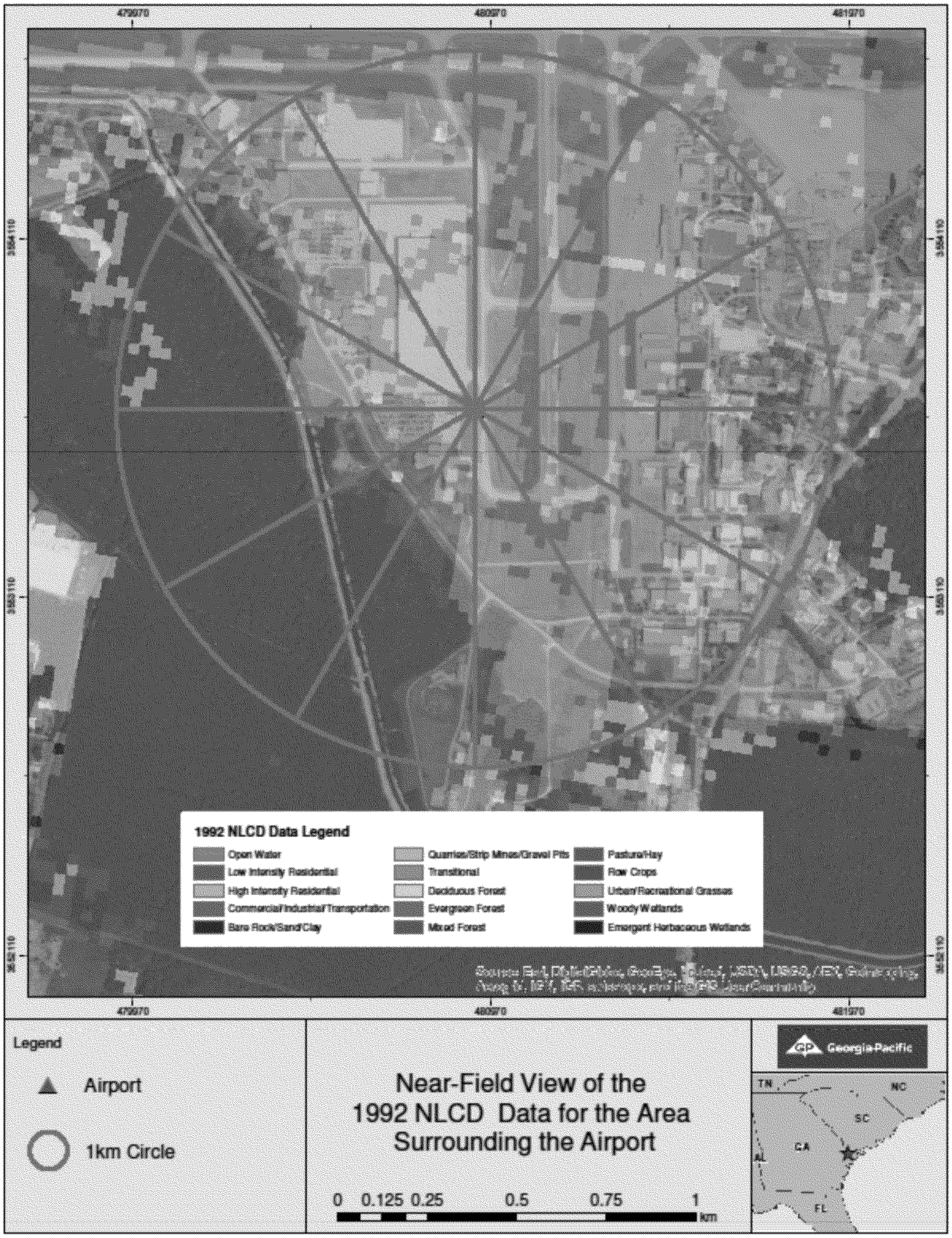
Figure A-6. Near-Field View of the 1992 NLCD Data for the Area Surrounding Savannah/Hilton Head Airport



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Modeling Protocol Addendum # 1

Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh Modeling Protocol Addendum Submitted by Georgia EPD June 15, 2016

The Georgia Environmental Protection Division (EPD) reviewed the modeling protocol submitted for Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh to meet the requirements of the Data Requirements Rule for the 2010 1-hour SO_2 NAAQS (40 CFR 51.1203). This modeling protocol addendum provides additional justifications related to meteorological data representativeness, background concentrations, and offsite sources.

AERMET Surface Characteristics Comparison

Since no on-site meteorological data was available, the hourly meteorological data from the Savannah/Hilton Head Airport (Savannah Airport) located in Savannah, GA (surface) and the Charleston International Airport, SC (upper) NWS stations for the period of 2012-2014 will be used in this modeling.

A comparison of the surface characteristics (albedo, Bowen ratio, and surface roughness) between the Savannah Airport NWS surface meteorological station, the Georgia-Pacific Savannah River Mill facility site, and the Georgia Power Plant McIntosh facility site are shown in Table 1. All three sets used AERSURFACE (13016) derived for twelve 30-degree sectors out to 1 km at a seasonal temporal resolution for average surface moisture conditions. Albedo and Bowen ratio are relatively similar at all three sites. The average surface roughness is 0.2 m for the Georgia-Pacific Savannah River Mill facility site, 0.2 m for the Georgia Power Plant McIntosh facility site, and 0.1 m for the Savannah airport. The surface roughness values for all three sites are characteristic of common grassland/herbaceous wetlands. Therefore, no significant differences in the albedo, Bowen ratio, and surface roughness were found.

Table1. Comparisons of surface characteristics (albedo, Bowen ratio, and surface roughness) at the Savannah Airport NWS station, the Georgia-Pacific Savannah River Mill facility site, and the Georgia Power Plant McIntosh facility site.

Season	Sector	**Savannah Airport**			**Savannah River Mill**			**Plant McIntosh**		
		Surface Albedo	Bowen Ratio	Surface Roughness	Surface Albedo	Bowen Ratio	Surface Roughness	Surface Albedo	Bowen Ratio	Surface Roughness
Winter	1	0.15	0.57	0.023	0.14	0.47	0.263	0.14	0.40	0.057
Winter	2	0.15	0.57	0.036	0.14	0.47	0.205	0.14	0.40	0.300
Winter	3	0.15	0.57	0.043	0.14	0.47	0.076	0.14	0.40	0.171
Winter	4	0.15	0.57	0.064	0.14	0.47	0.047	0.14	0.40	0.292
Winter	5	0.15	0.57	0.046	0.14	0.47	0.081	0.14	0.40	0.238
Winter	6	0.15	0.57	0.02	0.14	0.47	0.074	0.14	0.40	0.334
Winter	7	0.15	0.57	0.153	0.14	0.47	0.265	0.14	0.40	0.144
Winter	8	0.15	0.57	0.178	0.14	0.47	0.273	0.14	0.40	0.056
Winter	9	0.15	0.57	0.211	0.14	0.47	0.141	0.14	0.40	0.274
Winter	10	0.15	0.57	0.093	0.14	0.47	0.143	0.14	0.40	0.147
Winter	11	0.15	0.57	0.03	0.14	0.47	0.111	0.14	0.40	0.043
Winter	12	0.15	0.57	0.016	0.14	0.47	0.139	0.14	0.40	0.108
Spring	1	0.15	0.48	0.029	0.14	0.4	0.302	0.14	0.34	0.066
Spring	2	0.15	0.48	0.042	0.14	0.4	0.242	0.14	0.34	0.334
Spring	3	0.15	0.48	0.05	0.14	0.4	0.092	0.14	0.34	0.198
Spring	4	0.15	0.48	0.073	0.14	0.4	0.056	0.14	0.34	0.341
Spring	5	0.15	0.48	0.055	0.14	0.4	0.099	0.14	0.34	0.274
Spring	6	0.15	0.48	0.028	0.14	0.4	0.094	0.14	0.34	0.386
Spring	7	0.15	0.48	0.192	0.14	0.4	0.296	0.14	0.34	0.167
Spring	8	0.15	0.48	0.224	0.14	0.4	0.315	0.14	0.34	0.071
Spring	9	0.15	0.48	0.259	0.14	0.4	0.170	0.14	0.34	0.336
Spring	10	0.15	0.48	0.122	0.14	0.4	0.174	0.14	0.34	0.186
Spring	11	0.15	0.48	0.039	0.14	0.4	0.137	0.14	0.34	0.056
Spring	12	0.15	0.48	0.022	0.14	0.4	0.169	0.14	0.34	0.131
Summer	1	0.15	0.39	0.041	0.14	0.3	0.365	0.14	0.27	0.070
Summer	2	0.15	0.39	0.05	0.14	0.3	0.270	0.14	0.27	0.344
Summer	3	0.15	0.39	0.056	0.14	0.3	0.105	0.14	0.27	0.204
Summer	4	0.15	0.39	0.079	0.14	0.3	0.064	0.14	0.27	0.359
Summer	5	0.15	0.39	0.061	0.14	0.3	0.114	0.14	0.27	0.305
Summer	6	0.15	0.39	0.035	0.14	0.3	0.110	0.14	0.27	0.467
Summer	7	0.15	0.39	0.208	0.14	0.3	0.318	0.14	0.27	0.185
Summer	8	0.15	0.39	0.242	0.14	0.3	0.350	0.14	0.27	0.087
Summer	9	0.15	0.39	0.27	0.14	0.3	0.234	0.14	0.27	0.374
Summer	10	0.15	0.39	0.138	0.14	0.3	0.207	0.14	0.27	0.213
Summer	11	0.15	0.39	0.048	0.14	0.3	0.175	0.14	0.27	0.067
Summer	12	0.15	0.39	0.029	0.14	0.3	0.244	0.14	0.27	0.145
Fall	1	0.15	0.57	0.036	0.14	0.47	0.350	0.14	0.40	0.068
Fall	2	0.15	0.57	0.045	0.14	0.47	0.250	0.14	0.40	0.341
Fall	3	0.15	0.57	0.05	0.14	0.47	0.093	0.14	0.40	0.202
Fall	4	0.15	0.57	0.073	0.14	0.47	0.056	0.14	0.40	0.357
Fall	5	0.15	0.57	0.055	0.14	0.47	0.099	0.14	0.40	0.298
Fall	6	0.15	0.57	0.029	0.14	0.47	0.095	0.14	0.40	0.450
Fall	7	0.15	0.57	0.192	0.14	0.47	0.299	0.14	0.40	0.170
Fall	8	0.15	0.57	0.228	0.14	0.47	0.334	0.14	0.40	0.075
Fall	9	0.15	0.57	0.26	0.14	0.47	0.222	0.14	0.40	0.358
Fall	10	0.15	0.57	0.124	0.14	0.47	0.190	0.14	0.40	0.195
Fall	11	0.15	0.57	0.041	0.14	0.47	0.159	0.14	0.40	0.058
Fall	12	0.15	0.57	0.023	0.14	0.47	0.231	0.14	0.40	0.139

Offsite Sources and Background Concentration

Emissions from Georgia-Pacific Savannah River Mill and Georgia Power Plant McIntosh (including both the coal and combined cycle facilities) will be explicitly modeled. In addition, two offsite sources (SCE&G JASPER GENERATING STATION and Effingham County Power, LLC) will be modeled with potential SO_2 emissions. The potential SO_2 emissions from these two offsite sources are substantially higher than the actual SO_2 emissions. EPD agrees with the inclusion of these two offsite sources and feels that the use of potential SO_2 emissions will be conservative. Figure 1 contains a spatial map of actual annual 2014 SO_2 emissions (TPY) from the draft 2014 NEI_v1 for all sources within 50 km the Georgia-Pacific Savannah River Mill facility. Table 2 contains a detailed list of facilities within 50 km from the Georgia-Pacific Savannah River Mill facility and the emission (TPY)/distance (km), or Q/d. International Paper - Savannah is over 20 km away and will be modeled separately as part of the Data Requirements Rule for the 2010 1-hour SO_2 NAAQS. Georgia Power Plant Kraft was retired in 2015. Weyerhaeuser NR Port Wentworth is the only source less than 20 km away (19.9 km) with a Q/d greater than 20. Imperial-Savannah, L.P. is the only remaining facility with a Q/d greater than 20, but it is located more than 20 km away (21.5 km). All the other Q/d values are less than 20. Therefore, no additional offsite sources will be explicitly modeled and the impact from those sources will be captured in the background concentration.

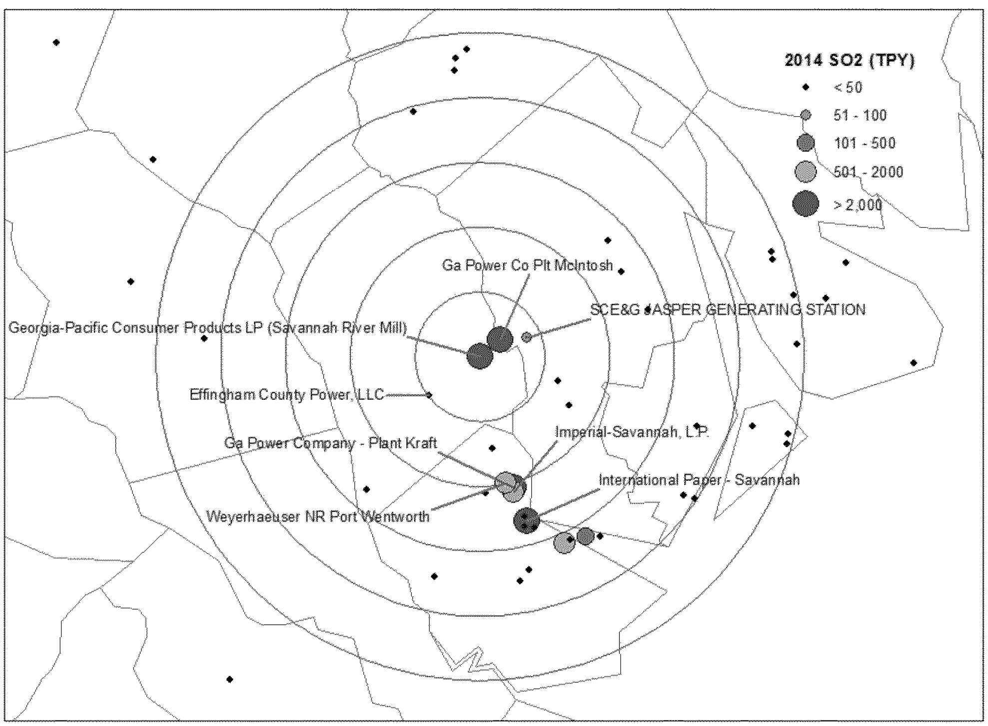

Figure 1. Map of actual annual 2014 SO_2 emissions (TPY) from offsite sources near the Georgia-Pacific Savannah River Mill facility. Red circles are placed in 10 km increments out to 50 km.

Table 2. List of facilities within 50 km from the Georgia-Pacific Savannah River Mill facility and the emission (TPY)/distance (km), or Q/d.

FACILITY ID	FACILITY NAME	SO_2 Emissions (TPY)	distance (km)	Q/d
10300003	Ga Power Co Plant McIntosh	2267.8	4.1	549
5100007	International Paper - Savannah	8122.7	26.3	309
5100006	Ga Power Company - Plant Kraft	5140.1	20.9	245
5100010	Weyerhaeuser NR Port Wentworth	570.3	19.9	29
5100110	Imperial-Savannah, L.P.	582.0	21.5	27
5100077	Southern States Phosphate & Fertilizer	597.1	31.6	19
13005611	SCE&G JASPER GENERATING STATION	98.6	7.9	12
10300014	Ga Power Company - McIntosh Combined Cycle Facility	15.9	2.5	6
5100008	Savannah Acid Plant LLC	125.2	32.2	4
5100148	Arizona Chemical Corporation	34.7	27.1	1
5100205	Superior Landfill & Recycling Center	42.6	34.6	1
10300012	Effingham County Power, LLC	3.2	9.8	0
5100037	EMD Millipore Corporation	4.5	14.4	0
8306411	SANTEE COOPER HILTON HEAD	14.4	49.3	0
5100076	Colonial Terminals, Inc.	6.4	27.7	0
4781011	USMC RECRUIT DEPOT	9.9	49.0	0
4802311	ELLIOTT SAWMILLING	7.4	44.3	0
10300004	Simpson Lumber Company, LLC	2.0	26.9	0
3100028	Claude Howard Lumber Company, Inc.	3.6	55.1	0
3100005	W. M. Sheppard Lumber Co Inc,	2.4	42.6	0
4508411	HICKORY HILL LANDFILL/RECYCLING	1.5	27.0	0
9186311	Hilton Head Airport	1.3	49.0	0
5100149	Hunter Army Airfield	0.4	35.1	0
9159411	Ridgeland	0.2	26.6	0
5100019	Georgia-Pacific Gypsum Llc - Savannah Plant	0.1	31.5	0
17012111	HAIG POINT CLUB	0.1	39.8	0
5100046	Gulfstream Aerospace Corporation	0.1	21.1	0
5100012	Axeon Specialty Products	0.1	25.6	0
5100003	Southern LNG Company, L.L.C. -Elba Island LNG	0.0	33.4	0
4834011	US MARINE CORPS AIR STATION	0.0	47.5	0
5100017	Ga Power Company - Plant Boulevard	0.0	33.7	0
16906311	COASTAL DEBRIS	0.0	25.5	0
4508311	SCE&G HARDEEVILLE	0.0	12.6	0
12084911	BEAUFORT COUNTY MEMORIAL HOSPITAL	0.0	49.3	0
11099511	MELROSE LANDING	0.0	38.0	0
16083011	SALTY FARE LANDNG	0.0	43.5	0
4760611	VALMONT COMPOSITE STRUCTURES ESTILL	0.0	46.1	0
9159511	ATHENA CORPORATION	0.0	15.7	0
11426511	DAVIS	0.0	39.1	0
10942511	HARPERS	0.0	47.4	0
12486811	BEAUFORT MCAS /MERRITT FIELD/	0.0	47.8	0

Since all SO_2 sources within 10 km are explicitly modeled, a background SO_2 concentration of 5 ppb (13.1 □g/m^3) will be used in the modeling. EPD agrees with the proposed background SO_2 concentration based on 2013-2015 SO_2 monitoring data from the South DeKalb site (13-089-0002). The 2013-2015 three year design value for this monitor is 5 ppb (13.1 □g/m^3). Figure 2 contains a spatial map of actual annual 2014 SO_2 emissions (TPY) from the draft 2014 NEI_v1 for all sources within 20 km of the South DeKalb SO_2 monitor. Table 2 contains a detailed list of facilities within 20 km of the South DeKalb SO_2 monitor and the emission (TPY)/distance (km), or Q/d. The total SO_2 emissions not modeled within 20 km from the Georgia-Pacific Savannah River Mill facility is 574.9 TPY and the total SO_2 emissions within 20 km of the South DeKalb SO_2 monitor is 1,017 TPY. Therefore, the 3-year design value from the South DeKalb SO_2 monitor will be a conservative estimate of background SO_2 concentrations near the Georgia-Pacific Savannah River Mill facility.

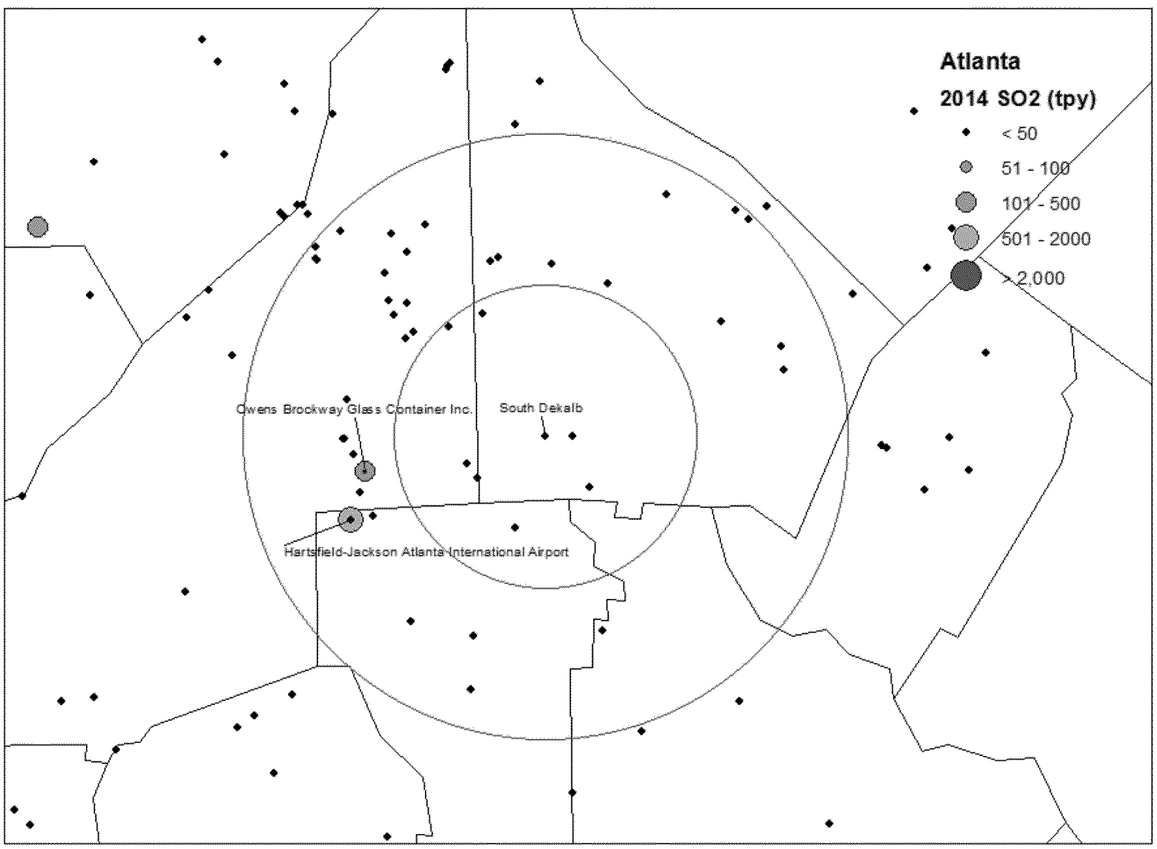

Figure 2. Map of actual annual 2014 SO_2 emissions (TPY) from offsite sources near the South DeKalb SO_2 monitor. Red circles are placed in 10 km increments out to 20 km.

Table 3. List of facilities within 20 km of the South DeKalb SO_2 monitor and the emission (TPY)/distance (km), or Q/d.

FACILITY ID	FACILITY NAME	SO_2 Emissions (TPY)	distance (km)	Q/d
9748811	Hartsfield-Jackson Atlanta International Airport	759	14	54
12100020	Owens Brockway Glass Container Inc.	242	12	20
6300030	Hartsfield-Jackson Atlanta International Airport	10	14	1
8900299	Seminole Road MSW Landfill	3	5	1
8900224	Dart Container Corporation of Georgia	2	16	0
15100025	Transcontinental Gas Pipe Line Company, LLC - Compressor Station 120	1	13	0
12100807	Delta Airlines - General Office Facilities	0	13	0
6300059	Delta Air Lines Inc - Atlanta Station	0	12	0
12100254	PPG Industries Inc.	0	13	0
6300026	Griffin Industries, Inc. of Georgia	0	6	0
8900239	Bimbo Bakeries USA, Inc.	0	2	0
8900097	New WinCup Stone Mountain	0	18	0
8900263	Waste Management Inc/Live Oak Landfill	0	6	0
8900226	Woodbridge Foam Corp	0	17	0
6300008	Sherwin-Williams Co	0	14	0

Modeling Protocol Addendum # 2

SO$_2$ DRR Modeling Updates
Submitted by Georgia EPD on September 30, 2016

<u>Georgia Power Plant McIntosh and Georgia Pacific Savannah River Mill</u>
EPA requested that International Paper Savannah (IP-Savannah), Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft be included in the modeling. Since IP-Savannah modeling has already been submitted to EPA to fulfill DRR modeling requirements, we would like to use this existing modeling to help develop background concentrations for the requested sources.

To account for the impacts from IP-Savannah, we are proposing to use the maximum modeled SO$_2$ concentration from IP-Savannah (without background added) along the northern and upper western modeling domain boundary (see Figure 1 and attached Excel file). Based on this analysis, the maximum SO$_2$ concentration along the northern and upper western modeling domain boundary is 19.2 ppb. Using this value to represent the impacts from IP-Savannah in the Plant McIntosh/Georgia Pacific Savannah River Mill modeling domain will be a very <u>conservative</u> assumption since the SO$_2$ concentrations will continue to decrease at further distances.

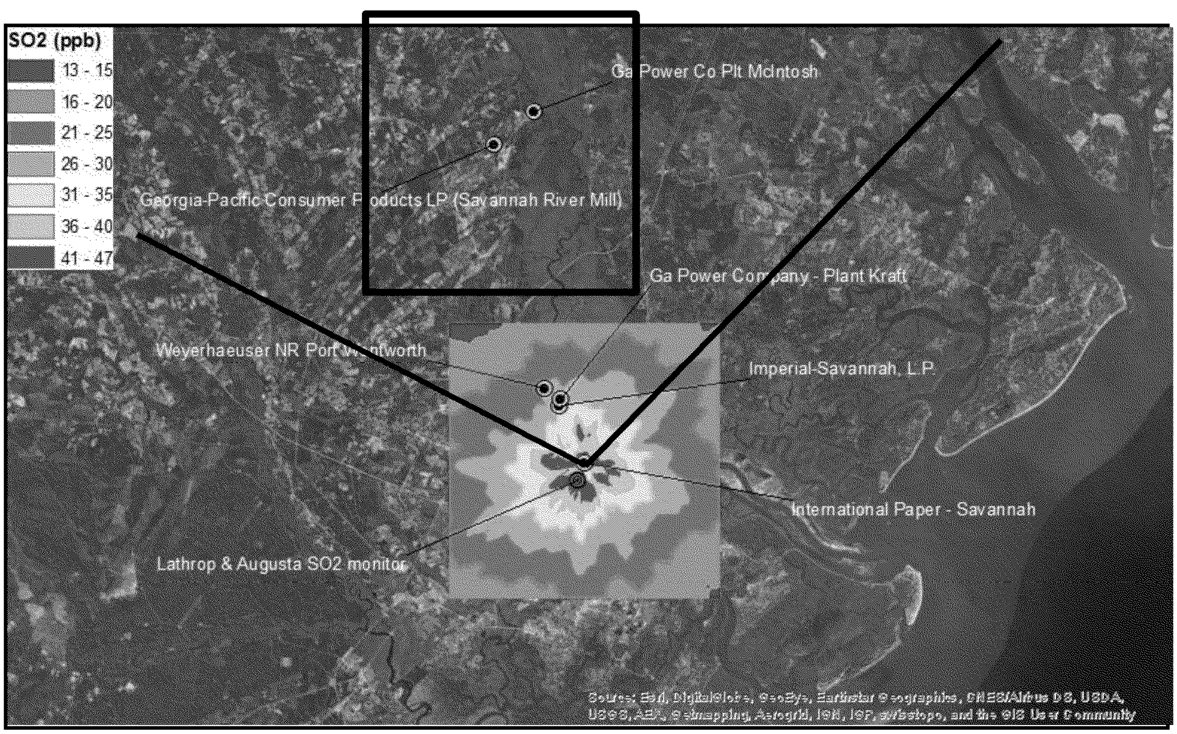

Figure 1. Modeling domains for IP-Savannah and Plant McIntosh/Georgia Pacific Savannah River Mill.

As part of the IP-Savannah modeling, Georgia EPD developed seasonal hour of day background SO_2 concentrations. These background values are meant to include impacts from all large sources in Savannah except IP-Savannah (e.g., Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft, plus other nearby sources) surrounding the Lathrop & Augusta SO_2 monitor (13-051-1002). The seasonal hour of day background concentrations were calculated for each of the four seasons using the following steps:

1. For each of the three years of data, SO_2 data was sorted by wind direction.
2. All SO_2 values corresponding to a wind direction between 10° and 45° were ignored since those impacts were directly attributable to IP-Savannah.
3. For each year, the remaining SO_2 data was sorted by season; spring (March-May), summer (June-August), fall (September- November), and winter (December-February).
4. For each season, SO_2 data was sorted by hour of day.
5. For each year and season, the second highest SO_2 value was selected for each hour of the day.
6. The average over the three years of the second highest SO_2 value was calculated for each hour of the day for each season.

For the IP-Savannah DRR modeling, 2011-2013 SO_2 data was used to develop the seasonal hour of day SO_2 background concentrations. However, for this modeling we are proposing to use 2012-2014 SO_2 data to develop the seasonal hour of day SO_2 background concentrations to be consistent with the actual emissions and meteorology used in the Plant McIntosh/Georgia Pacific Savannah River Mill modeling. Table 1 and Figure 2 show the seasonal hour of day SO_2 background concentrations that we propose to use in this modeling. The detailed calculations are included in the attached Excel file.

Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft are located approximately 7 km away from the Augusta & Lathrop SO_2 monitor. These same facilities are located approximately 20 km away from Plant McIntosh and Georgia Pacific Savannah River Mill and approximately 10 km away from the edge of the Plant McIntosh and Georgia Pacific Savannah River Mill modeling domain. Therefore, the use of the 2012-2014 seasonal hour of day background SO_2 concentrations will be a conservative estimate of the background (not including IP-Savannah) since the Plant McIntosh and Georgia Pacific Savannah River Mill modeling domain it is further away from Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft than the Augusta & Lathrop SO_2 monitor.

By adding 19.2 ppb from IP-Savannah to the 2012-2014 seasonal hour of day background SO_2 concentrations described above, the impacts from IP-Savannah, Weyerhaeuser NR Port Wentworth, Imperial-Savannah, L.P., and Georgia Power Plant Kraft will be conservatively accounted for in the combined seasonal hour of day SO_2 background concentration. This combined seasonal hour of day SO_2 background concentration will be added to the modeled design concentration for the sources that were explicitly modeled in the Plant McIntosh/Georgia Pacific Savannah River Mill modeling domain and compared to the NAAQS.

Table 1. Seasonal hour of day background SO_2 concentration in Savannah (not including IP-Savannah) for 2012-2014.

Hour of Day	Winter	Spring	Summer	Fall
1	12.0	4.5	3.6	6.5
2	12.0	4.9	3.7	6.3
3	19.0	4.5	4.7	7.7
4	11.0	4.4	4.4	12.3
5	9.6	7.1	5.0	8.6
6	7.6	7.5	5.2	10.4
7	8.3	6.6	8.0	15.4
8	10.2	7.3	13.4	13.8
9	13.4	14.5	9.0	18.2
10	20.0	18.1	21.1	24.1
11	19.0	20.3	14.9	22.8
12	26.9	24.9	14.1	21.0
13	22.5	12.8	11.9	19.8
14	18.7	17.2	11.0	17.2
15	24.6	12.5	15.8	17.7
16	20.5	8.1	5.2	9.0
17	10.2	6.3	5.9	11.7
18	8.8	5.9	5.6	7.1
19	11.0	5.9	4.5	6.7
20	6.9	5.9	4.5	5.6
21	7.0	6.8	5.2	7.9
22	6.8	5.5	4.6	9.9
23	7.7	6.3	3.6	7.3
24	11.6	6.4	3.6	11.7

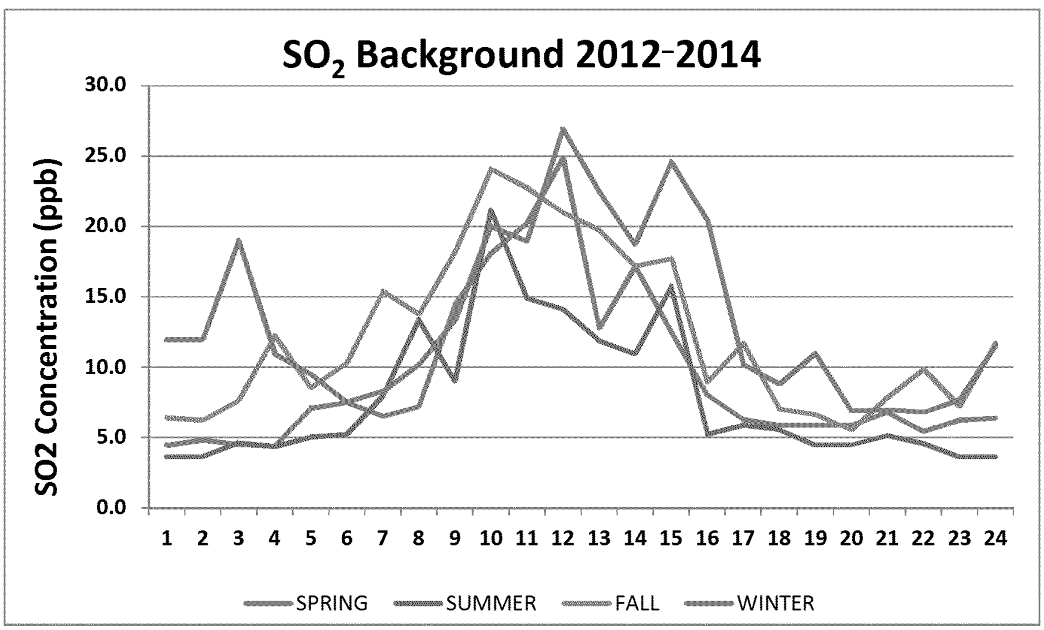

Figure 2. Seasonal hour of day SO_2 background concentration in Savannah (not including IP-Savannah) for 2012-2014.

Appendix B
Electronic Modeling Archive

To: Davis, Scott[Davis.ScottR@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Rinck, Todd[Rinck.Todd@epa.gov]
Cc: Martha Sims[Martha.Sims@ipaper.com]; Billy J Scott[Billy.Scott@ipaper.com]; lbb@adem.state.al.us[lbb@adem.state.al.us]; Healan, Geoffrey (GAH@adem.alabama.gov)[GAH@adem.alabama.gov]
From: Chuck Doyno
Sent: Tue 1/31/2017 10:04:21 PM
Subject: FW: IP Prattville Updated SO2 Modeling
IP Prattville SO2 DRR 16216 run.zii

All – Please find the attached updated SO2 DRR modeling files for IP Prattville. The modeling was updated using AERMOD Version 16216r based on conversations with ADEM. Note that the results did not change from what was previously submitted (i.e., 4th high concentration was 179.93 μg/m³). The attached file extension will need to be updated from "zii" to "zip" prior to accessing the modeling files.

If you have any questions, please give me a call.

Thanks,

Chuck

Chuck Doyno | Project Manager

cdoyno@all4inc.com | 678.460.0324 x204 | Profile | LinkedIn

All4 Inc. | Philadelphia | Atlanta | Houston | Washington DC

From: Chuck Doyno
Sent: Tuesday, January 31, 2017 11:20 AM
To: Leigh Bacon; Healan, Geoffrey (GAH@adem.alabama.gov)
Cc: Martha Sims; Billy J Scott
Subject: IP Prattville Updated SO2 Modeling

Leigh and Geoff – We reran the IP Prattville SO_2 DRR modeling with AERMOD Version

16216r. There was no change in the 4th high concentration of 179.93 $\mu g/m^3$ from the modeling results submitted as part of the SO_2 DRR Modeling Report. I have attached the updated modeling files for your reference. I wasn't sure if you still had issues receiving zip files, so I changed the file extension to zii to be safe. If you have any questions or need anything else, please give me a call.

Thanks,

Chuck

Chuck Doyno | Project Manager

cdoyno@all4inc.com | 678.460.0324 x204 | Profile | LinkedIn

All4 Inc. | Philadelphia | Atlanta | Houston | Washington DC

Website | Blog | Newsletter | LinkedIn | Twitter | Facebook | Awards

To: Davis, Scott[Davis.ScottR@epa.gov]
Cc: Bradley, Twunjala[Bradley.Twunjala@epa.gov]; Bell, Tiereny[Bell.Tiereny@epa.gov]; Benjamin, Lynorae[benjamin.lynorae@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Read, Hastings[Hastings.Read@dep.state.fl.us]; McLane, Preston[Preston.McLane@dep.state.fl.us]; Koerner, Jeff[Jeff.Koerner@dep.state.fl.us]
From: Himes, Brian
Sent: Fri 1/13/2017 2:11:48 PM
Subject: Florida Data Requirements Rule Submittal
Florida DRR Submittal Letter 01-13-17.pdf

Mr. Davis,

Please find attached Florida's Letter of Submittal outlining the State's required response to EPA's Data Requirements Rule for the 2010 Sulfur Dioxide National Ambient Air Quality Standard (40 CFR Part 51, Subpart BB).

We have consolidated the complete set of area characterization reports including the supporting data and modeling files on a DVD, which was sent to your office today along with a hard copy of the final suite of reports. In addition, all of these reports and the associated data may be retrieved from the State's FTP site using the password "FloridaDRR" here.

If you have any questions about this submittal, please feel free to contact me at (850) 717-9005 or by e-mail at Brian.Himes@dep.state.fl.us.

Thanks,

Brian Himes

Environmental Consultant

Division of Air Resource Management

Florida Department of Environmental Protection

2600 Blair Stone Road, MS 5500

Tallahassee, FL 32399

Office: (850) 717-9005

Brian.Himes@dep.state.fl.us

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

Via U.S. Mail and Electronic Mail

January 13, 2017

Mrs. Heather McTeer Toney
Regional Administrator
U.S. Environmental Protection Agency – Region 4
61 Forsyth Street SW – Mail Code: 9T25
Atlanta, GA 30303-8909

Re: Data Requirements Rule for the 2010 One-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard – Air Dispersion Modeling Demonstrations

Dear Mrs. Toney:

In accordance with 40 C.F.R. 51.1203, and in response to the U.S. Environmental Protection Agency's (EPA) August 21, 2015 Data Requirements Rule (DRR) (80 Fed. Reg. 51,052), the Florida Department of Environmental Protection (Department) hereby submits a suite of reports addressing each of the twelve primary sources identified in the Department's January 15, 2016 submittal to EPA Region 4. This includes eleven area characterization reports (Appendices B through L) that address each of the active sources. The twelfth report addresses Gulf Power Company's Lansing Smith Electric Generating Plant, which ceased operations on March 30, 2016, in compliance with the facility's Title V operating permit. This submittal includes a technical report (Appendix A) addressing the enforceable permit conditions limiting Lansing Smith to less than 2,000 tons per year (tpy) of sulfur dioxide (SO_2) emissions.

Each area characterization consists of an air dispersion modeling demonstration assessing the ambient air quality in the area around the primary source with respect to the 2010 one-hour SO_2 National Ambient Air Quality Standard (NAAQS). These modeling demonstrations were performed in accordance with the Department's June 30, 2016 technical modeling protocol submittal to EPA Region 4 and all applicable rules and guidance including *Appendix W to 40 CFR Part 51: The Guideline on Air Quality Models* and EPA's *SO_2 NAAQS Designations Modeling Technical Assistance Document*.

Ten of the eleven area characterizations provided through this submittal clearly reflect that historic and current operating conditions at the source are not contributing to a violation of the 2010 SO_2 NAAQS. With regard to the eleventh area characterization (Appendix K), which addresses the Mosaic New Wales phosphate fertilizer manufacturing plant in Mulberry, Florida, the Department intends to supplement the attached modeling demonstration with another based on additional federally-enforceable permit limits and operational changes reflecting a range of SO_2 reduction projects currently underway pursuant to a pending consent decree between Mosaic and the U.S. EPA. The Department expects these projects to be completed in significant part prior to any final area designation determinations or nonattainment planning periods.

With the exception of the two existing nonattainment areas in Hillsborough and Nassau Counties, the Department recommends that the entire State of Florida be designated as "attainment" or "unclassifiable" for the 2010 SO_2 NAAQS. This recommendation is based on the required area-specific analyses under the DRR and current data from the state's existing SO_2 ambient monitoring network.

The complete submittal package (hard copy and electronic copy) has been sent directly to the Air Planning Branch for EPA Region 4, together with the data files used in generating each air dispersion modeling report. The electronic copy is in a searchable format and is an exact duplicate of the hard copy. If you have any questions about this submittal, please contact me at (850) 717-9000 or by email at Jeff.Koerner@dep.state.fl.us.

Sincerely,

Jeffrey J. Koerner

Jeff Koerner, Director
Division of Air Resource Management

JK/pm
cc (with package): R. Scott Davis, Chief, Air Planning Branch, EPA Region 4
Tiereny Bell
Lynorae Benjamin
Twunjula Bradley
Rick Gillam

To: Davis, Scott[Davis.ScottR@epa.gov]
Cc: Benjamin, Lynorae[benjamin.lynorae@epa.gov]; Ceron, Heather[Ceron.Heather@epa.gov]; Bradley, Twunjala[Bradley.Twunjala@epa.gov]; Rinck, Todd[Rinck.Todd@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Green, Justin B.[Justin.B.Green@dep.state.fl.us]; Himes, Brian[Brian.Himes@dep.state.fl.us]
From: McLane, Preston
Sent: Thur 6/30/2016 6:44:26 PM
Subject: DRR - Florida - Modeling Protocol
DRR_Florida_Modeling Protocol Submittal_06-30-16.pdf
DRR_Florida_Modeling Inventory.xlsx
DRR_Florida_Modeling Summary.xlsx

Greetings,

Please find attached Florida's Modeling Protocol Submittal and two technical appendices (Florida Modeling Inventory and Florida Modeling Summary) submitted pursuant to the requirement of EPA's Data Requirements Rule for the 2010 Sulfur Dioxide National Ambient Air Quality Standard (40 CFR Part 51, Subpart BB).

We have also consolidated the attached information, together with several larger supplemental data files, on a DVD, which was sent to your office today via FedEx.

If you have any questions about this submittal, please feel free to contact me at (850) 717-9089 or by e-mail at Preston.McLane@dep.state.fl.us.

Best regards,

- Preston

Preston McLane

Program Administrator

Division of Air Resource Management

Florida Department of Environmental Protection

2600 Blair Stone Road, MS 5500

Tallahassee, Florida 32399-2400

Office: (850) 717-9089

Preston.McLane@dep.state.fl.us

Florida Department of Environmental Protection

Bob Martinez Center
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Jonathan P. Steverson
Secretary

Via Federal Express and Electronic-Mail

June 30, 2016

R. Scott Davis
Chief, Air Planning Branch
Air, Pesticides, and Toxics Management Division
U.S. Environmental Protection Agency – Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

Re: Data Requirements Rule for the 2010 One-Hour Sulfur Dioxide Primary National Ambient Air Quality Standard – Technical Modeling Protocol Submittal

Dear Mr. Davis:

On August 21, 2015, the U.S. Environmental Protection Agency (EPA) promulgated the "Data Requirements Rule" (DRR) (80 FR 51052; codified at 40 CFR Part 51, Subpart BB), which requires states to evaluate compliance with the 2010 one-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS) in areas surrounding specified SO_2 sources. As you are aware, on January 15, 2016, Florida submitted to EPA Region 4 a list of sources in Florida with SO_2 emissions that exceeded a 2,000 tons-per-year (tpy) threshold during the most recent year for which data are available. Pursuant to the DRR, states can choose to perform area characterizations around the specified sources using either air quality monitoring or air dispersion modeling. The Florida Department of Environmental Protection (Department) has chosen to characterize the areas around the state's eleven facilities subject to the DRR (primary facilities) using the air dispersion modeling approach.[1]

For areas that states choose to characterize using air dispersion modeling, a technical modeling protocol must be submitted to the applicable EPA Regional Administrator no later than July 1, 2016. This modeling protocol is required to include information about the general dispersion modeling approach that the state will follow, including the model, modeling domain, receptor grid, emissions dataset(s), meteorological dataset(s), and the method by which the state air agency will account for background SO_2 concentrations. 40 CFR 51.1203(b). This letter,

[1] As noted in the Department's January 15, 2016, submittal to EPA Region 4, Gulf Power Company's Lansing Smith Plant (Source ID No. 005-0014) shut down its coal-fired units effective March 31, 2016. The remaining emissions units at the facility have a combined potential to emit SO_2 less than 2000 tons-per-year. No further analysis of this source is required under the DRR.

together with the accompanying appendices, meets the requirements of 40 CFR 51.1203(b) for a technical modeling protocol under the DRR.

The Department's dispersion modeling performed in response to DRR requirements will follow all applicable EPA guidance, including *Appendix W to 40 CFR Part 52: The Guideline on Air Quality Models* (Appendix W) and the *SO_2 NAAQS Designations Modeling Technical Assistance Document* (Modeling TAD). The Department recognizes that a revised version of Appendix W is currently under review by EPA and should be finalized before states' final modeling demonstrations are scheduled to be submitted. This technical modeling protocol will, therefore, follow the revised Appendix W, as proposed. DEP will, however, adhere to the finalized version of Appendix W in completing modeling for area characterizations under the DRR.[2]

General Dispersion Modeling Approach

All eleven areas in Florida subject to characterization under the DRR will be assessed individually using the most recent regulatory version of EPA's preferred near-field dispersion model for inert pollutants —AERMOD—including the pre-processing programs AERMET, AERMINUTE, AERMAP, and AERSURFACE.

Dispersion Model

Appendix W recommends the use of AERMOD for all regulatory modeling of inert pollutants in the near field. The Department will process the AERMOD model using the most recent version of Lakes Environmental's *AERMOD View* program with the following options and settings:

- Regulatory default options (MODELOPT DFAULT CONC)
- Pollutant: SO_2 (POLLUTID SO2)
- Averaging Time: 1 hour (AVERTIME 1)
- Output: Annual fourth-high daily maximum 1-hour average, averaged over five years (RECTABLE ALLAVE 4TH RECTABLE 1 4TH)
- Receptor, building, and source elevations based on data from AERMAP
    - NED GEOTIFF – 10m resolution
- Land use: rural dispersion methods only
    - All modeled areas are classified rural through the Auer Land Use Method
- Building downwash parameters will be calculated for all sources at the primary facilities using the Building Profile Input Program for PRIME (BPIPPRM) for input into AERMOD

[2] The Department has a pending request with EPA's Modeling Clearinghouse for the use of a non-guideline, alternative model (LOWWIND3) in Hillsborough County for the state's air quality characterization modeling under the DRR.

Receptor Grid

According to EPA's March 2011 Memo *Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard*, it is expected that the distance from the source to the area of the maximum 1-hour impact of SO_2 will be approximately 10 times the source release height. As a conservative approach, the Department will extend a dense grid of receptors from the primary facility's tallest stack (if multiple stacks are the tallest, the most centrally located of these will be chosen) to the greater of 20 times the tallest stack height at the primary facility or 2500m. Receptor density will then decrease in 2500m intervals as follows:

- Discrete Cartesian receptors
  - 50m spacing along primary facility fence line;
  - 100m spacing to greater of 20 x tallest stack height or 2500m;
  - 250m spacing to 2500m beyond 100m grid;
  - 500m spacing to 2500m beyond 250m grid.
  - The receptor grid will be expanded if increasing concentrations are found near the edge or if high concentrations are found in an area with insufficiently dense grid spacing. Any receptors placed within a modeled facility's fence line will be removed. At present, DEP does not anticipate utilizing the DRR-allowed method for removing receptors in areas where it is not possible to place a monitor.

Meteorological Data

Florida has very uniform, mostly flat terrain and a relatively dense network of high-quality National Weather Service (NWS) Automated Surface Observing System (ASOS) stations for use in air dispersion modeling demonstrations. Meteorological surface observations for 2012 - 2014 from the nearest representative NWS ASOS station will be processed with the most recent version of AERMET for use in area characterizations performed for the DRR. These data, including the integrated surface hourly data (ISHD) and ASOS 1-minute wind data, will be retrieved from the National Climatic Data Center's (NCDC) file transfer protocol site. Upper air parameters will be derived from radiosonde observations (RAOB) from the nearest NWS sounding location. Missing 12Z soundings will be filled with archived modeled soundings from the National Oceanic and Atmospheric Administration's (NOAA) Air Resources Laboratory (ARL) prior to processing in AERMET.

The following explicit options and settings will be used when processing AERMET:

- ASOS 1-minute wind data processed by AERMINUTE (ASOS1MIN)
- Minimum wind speed threshold: 0.5 m/s (THRESH_1MIN 0.5)
- NWS wind and temp data are substituted for missing onsite data (METHOD REFLEVEL SUBNWS)
- Adjustments to u* for low wind speeds are used (METHOD STABLEBL ADJ_U*)
- Surface characteristics extracted from 1992 NLCD via AERSURFACE for the ASOS location

- Study area radius: 1 km
- Surface roughness varied by 12 sectors monthly

Emissions Data

Consistent with 40 CFR 51.1203(d), the Department will use either enforceable allowable emission rates or the most recently available dataset of actual emissions data to characterize the primary facilities. Long-term average allowable emission rates will be adjusted to an equivalent 1-hour emission rate using the method outlined in EPA's Modeling TAD. Actual emissions data from a recent period representative of current operations will be used to perform this calculation.

Background Characterization

Background concentrations of SO_2 will be characterized by both the explicit modeling of nearby large sources of SO_2 and the inclusion of an hour of day by season (BACKGRND SEASHR) varying background concentration derived from a nearby representative monitor. All facilities that emitted more than 100 tons of SO_2 in 2014 within 20 km of a primary facility will be modeled. Some additional large sources beyond 20 km will also be included on a case-by-case basis. All modeled background sources will be characterized with actual emissions data, where available, and enforceable allowable emission rates otherwise. The calculation of the varying monitored background will be performed by taking the three-year average of the seasonal second-high concentration by hour of day as outlined in the Modeling TAD. Prior to performing this calculation, monitored values that occurred when the wind direction was within 45 degrees of a modeled facility will be removed to avoid double-counting. Monitoring data for the years 2012-2014 will be used to perform these calculations in most areas.[3]

* * *

If you have any questions about this submittal, please contact Preston McLane at (850) 717-9089 or by e-mail at Preston.McLane@dep.state.fl.us.

Sincerely,

Justin B. Green, Director
Division of Air Resource Management

JG/pm

[3] In Hamilton County, the monitored background concentrations will be derived from 2014-2015 monitoring data due to the shutdown of several large sources of SO_2 near the reference monitor in 2014. In Citrus County, the monitored background concentrations will also be derived from 2014-2015 monitoring data as the reference monitor did not begin operation until December 2013.

Attachments

DRR_Florida_Modeling Inventory Excel File

- Modeled Sources: Preliminary inventory of explicitly modeled sources for each modeling domain.
- Un-modeled Nearby Sources: List of nearby sources represented in AERMOD with a monitored background concentration for each modeling domain.

DRR_Florida_Modeling Summary Excel File

- Background Monitors: Summary of ambient SO_2 monitors selected to represent background concentrations.
- Meteorological Sites: Summary of meteorological surface stations chosen for each modeling domain.
- Receptor Grids: Summary of the preliminary receptor grids for each modeling domain.

AERMET Files Folder

- Surface and upper air AERMET meteorological files for use in AERMOD.

Equivalency Ratio Calculations Folder

- Preliminary calculations for equivalent 1-hour emission rate ratios for sources with longer-term emission rates.

Overview Maps Folder

- Maps of each modeling domain for visual reference.

Monitored Background Development Folder

- Preliminary calculations of varying background concentrations for use in AERMOD for each modeling domain.

To: Banister, Beverly[Banister.Beverly@epa.gov]; Davis, Scott[Davis.ScottR@epa.gov]; Worley, Gregg[Worley.Gregg@epa.gov]; Benjamin, Lynorae[benjamin.lynorae@epa.gov]; Rinck, Todd[Rinck.Todd@epa.gov]; Bradley, Twunjala[Bradley.Twunjala@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Howard, Chris[Howard.Chris@epa.gov]; Krivo, Stan[Krivo.Stanley@epa.gov]
Cc: Munsey, Elisabeth[Elisabeth.Munsey@dnr.ga.gov]; Tian, Di[Di.Tian@dnr.ga.gov]; Kim, Yunhee[Yunhee.Kim@dnr.ga.gov]; Hays, Karen[Karen.Hays@dnr.ga.gov]; Kuoh, Dika[Dika.Kuoh@dnr.ga.gov]
From: Boylan, James
Sent: Wed 12/28/2016 7:53:02 PM
Subject: Plant Wansley Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO2 NAAQS
GAEPD_Plant_Wansley_Cover_Letter_Signed.pdf
GA_EPD_Plant_Wansley_12-28-2016.pdf
Wansley SO2 DRR Modeling Letter Report.pdf

Dear Ms. Banister,

On June 8, 2016, the Georgia Environmental Protection Division (EPD) submitted a letter to EPA describing the approach that will be used to characterize air quality at sources in Georgia that had annual actual SO_2 emissions exceeding 2,000 tons per year (tpy) in 2014. In that letter, EPD stated that Georgia Power Plant Wansley would be characterized with air quality modeling. A modeling protocol was submitted to EPA on June 17, 2016. This submittal contains 2012-2014 modeling that can be used for SO_2 designations.

A total of three (3) attachments are included:

(1) a copy of the cover letter from Ms. Karen Kays (EPD) to Ms. Beverly Banister (EPA),

(2) a final modeling report created by EPD, and

(3) a modeling report submitted by Georgia Power to EPD.

A hard copy of these three documents along with a copy of all modeling inputs/output files on a DVD have been placed in the mail. Should you or your staff have any questions, please feel free to contact me at (404) 363-7014.

Sincerely,

Jim Boylan

James W. Boylan, Ph.D.

Manager, Planning & Support Program

Georgia Department of Natural Resources

Environmental Protection Division - Air Protection Branch

4244 International Parkway, Suite 120

Atlanta, GA 30354

Office: 404-363-7014   Fax: 404-363-7100

E-mail: James.Boylan@dnr.ga.gov

GA EPD Dispersion Modeling for the 2010 1-Hour SO_2 NAAQS: Georgia Power - Plant Wansley December 28, 2016

Georgia Power's Plant Wansley is an affected source under EPA's Data Requirements Rule (DRR) because Plant Wansley emitted greater than 2,000 tons of SO_2 in 2014. To satisfy the requirements of the DRR, Georgia Power notified Georgia EPD that they will characterize air quality through the modeling option and submitted a dispersion modeling report and related modeling files on November 18, 2016. Dispersion modeling was conducted by Georgia Power. Georgia EPD reviewed the modeling report and files to ensure that the dispersion modeling was conducted in accordance with the final DRR and Modeling Technical Assistance Document (TAD).

This report discusses the procedures used to review the supporting dispersion modeling and the modeling results.

INPUT DATA

Meteorological Data – Since no on-site meteorological data was available, the hourly meteorological data of surface and upper air observations from the Peachtree City Airport, GA NWS station (KFFC) for the period of 2012-2014 was used in this modeling.

The meteorological data was compiled and provided by Georgia EPD. The AERMET processor (15181) was used to convert the NWS data into AERMOD model-ready meteorological data files using the AERSURFACE surface characteristics evaluation utility (13016). Values of the surface characteristics (albedo, Bowen ratio, and surface roughness) surrounding the Peachtree City Airport NWS surface station and the project site were derived for each of twelve 30-degree sectors over four seasons in accordance with the AERMOD Implementation Guide (09078). Georgia EPD compared the above AERSURFACE generated surface characteristics and found no significant differences in the albedo, Bowen ratio, and surface roughness for the two sites. Therefore, a meteorological dataset with the Peachtree City Airport NWS surface characteristics was used in the modeling. According to the 3-year wind rose for the Peachtree City Airport (Figure 1), the winds are predominantly from the northwest.

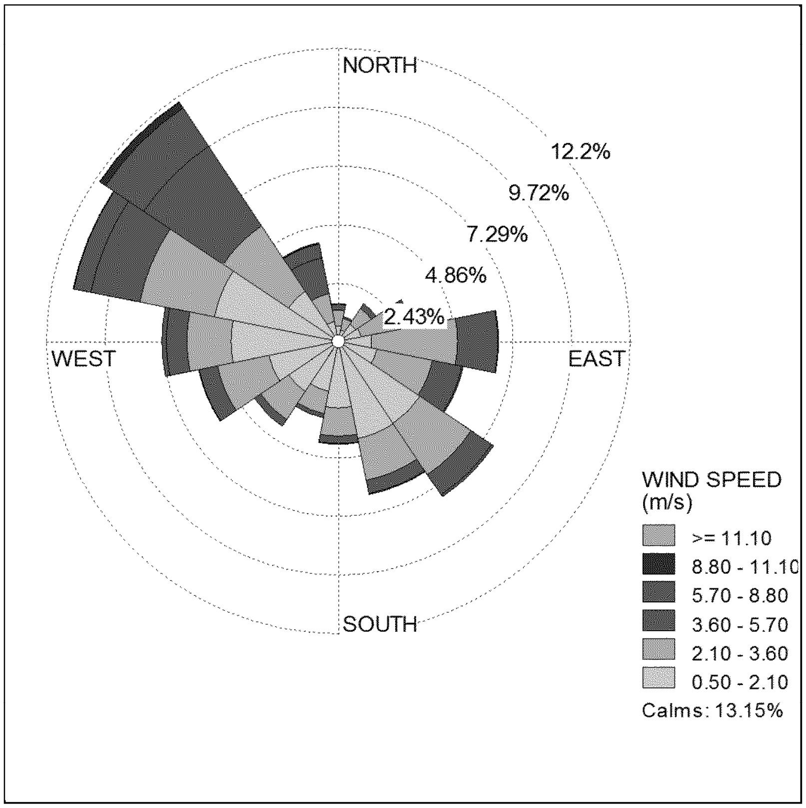

Figure 1. Three-year wind rose (2012-2014) for the Peachtree City Airport.

Source Data – Plant Wansley is an electric power generation plant operating two supercritical pulverized coal-fired boilers (Units 1 and 2). Each unit is equipped with a wet flue gas desulfurization (FGD) system for control of SO_2 emissions. During normal operations, the units exhausts through a 675-foot scrubber stack (Wan12FGD) which serves Units 1 and 2 (each with its own flue). However, there may be some periods of time during which a scrubber is not in operation. In these cases, the unit will exhaust through a 1000-foot bypass stack (Wan12BYP) which serves Units 1 and 2 (each with its own flue).

Actual hourly emissions, temperatures, and flow rates for the most recent three calendar years (2012-2014) were modeled for both units. This information was reported to EPA's Clean Air Markets Division (CAMD) under the Acid Rain Program using continuous emission monitoring systems (CEMS) certified according to 40 CFR Part 75. Figures 2-4 show the hourly SO_2 emission rates (g/s) that were modeled through each stack for Wan12FGD and Wan12BYP in 2012, 2013, and 2014.

Receptor Locations – A comprehensive Cartesian receptor grid extending to approximately 20 km from the Plant Wansley in all directions was used in the AERMOD modeling analysis to assess ground-level SO_2 concentrations. The Cartesian receptors were placed according to the following configuration based on the center of the Plant Wansley:

- 0 km – 2km ➔ 100 meters apart
- 2 km – 5 km ➔ 250 meters apart
- 5 km – 10 km ➔ 500 meters apart
- 10 km – 20 km ➔ 1,000 meters apart

This domain is sufficient to capture the maximum impact. Receptors were also placed at 100-m intervals within Plant Wansley's ambient air boundary. Although the SO_2 Modeling TAD specifies that receptors need not be placed at locations where it is not feasible to place a monitor (e.g., water bodies and within facility property lines), the receptor grid conservatively simulates all areas including within the facility's ambient air boundary that is not generally accessible to the public. This receptor grid represents a very conservative approach to the modeling analysis. All receptor locations are represented in the Universal Transverse Mercator projections, Zone 16, North American Datum 1983.

Terrain Elevation – Terrain data from USGS 1-sec National Elevation Dataset (NED) CONUS were extracted to obtain the elevations of receptors by AERMAP terrain processor (version 11103). The resulting elevation data were verified by comparing contoured receptor elevations with USGS 7.5-minute topographic map contours.

Building Downwash – The effects of building downwash were incorporated into the AERMOD analysis. Direction-specific building parameters required by AERMOD were developed using the BPIP PRIME utility (version 04274). Actual heights for the scrubber stacks and the bypass stacks were used in the modeling analysis.

Offsite Emission Inventory and Background – The following offsite SO_2 sources were included in the NAAQS modeling analysis in accordance with the previously submitted June 17, 2016 modeling protocol addendum and the September 27, 2016 modeling protocol update.

- Natural gas-fired Units 6 and 7 at Plant Yates
- Natural gas-fired combined-cycle Blocks 6 and 7 owned by Southern Power Company ("SPC") at the Wansley Combined-Cycle Generating Plant
- Natural gas-fired combined-cycle Block 8 owned by Oglethorpe Power Corporation ("OPC") at the Chattahoochee Energy Facility
- Natural gas-fired combined-cycle Block 9 owned by Municipal Electric Authority of Georgia ("MEAG Power")

Allowable/PTE SO_2 emissions and Good Engineering Practice (GEP) stack heights were used to model these sources. Information for the SPC, OPC, and MEAG Power combined-cycle units was obtained from the Georgia PSD Modeling Inventory (https://psd.georgiaair.org/inventory).

Plant Yates Units 1 - 5 were not included in the model since these units were retired on April 15, 2015. Also, Units 6-7 were converted from coal to natural gas on April 15, 2015. Permit condition 3.2.1 limits the fuel fired in the electric generating units (Units 6 and 7) to natural gas only. This limits the PTE of SO_2 for SG06 and SG07 to 18.34 tpy using AP-42 emission factors as follows:

AP-42, Fifth Edition, Volume I Chapter 1: External Combustion Sources, Section 1.4 Natural Gas Combustion, Table 1.4-2 lists an SO_2 emission factor of 0.6 lb/MMscf:

$$\square_2 = \left(\frac{3{,}489{,}216}{}\right)\left(\frac{8760}{}\right)\left(\frac{1}{10^6}\right)\left(\frac{0.6}{}\right)\left(\frac{}{2{,}000}\right)$$

$$\square_2 = 9.17$$

$$\square_2 \quad 06 \quad 07 = 18.34$$

Therefore, the max imum hourly SO_2 emission rate that will be modeled for Yates Unit 6 -7 will be 18.34 tons SO_2 x 2000 lbs/ton ÷ 8760 hrs/year = 4.2 lb/hr SO_2. Units 6 and 7 at Plant Yates exhaust to single stack equipped with two flues. Dual -flue stacks have distinct emission points close enough together resulting in a merged plume.

All offsite sources not modeled are adequately represented by the background concentration included in the modeling analysis. The background SO_2 concentration is based on the 2013-2015 design value at the South DeKalb monitor (13-089-002) of 5 ppb (13.1 $\mu g/m^3$). Detailed information can be found in the previously submitted June 17, 2016 modeling protocol addendum and the September 27, 2016 modeling protocol update.

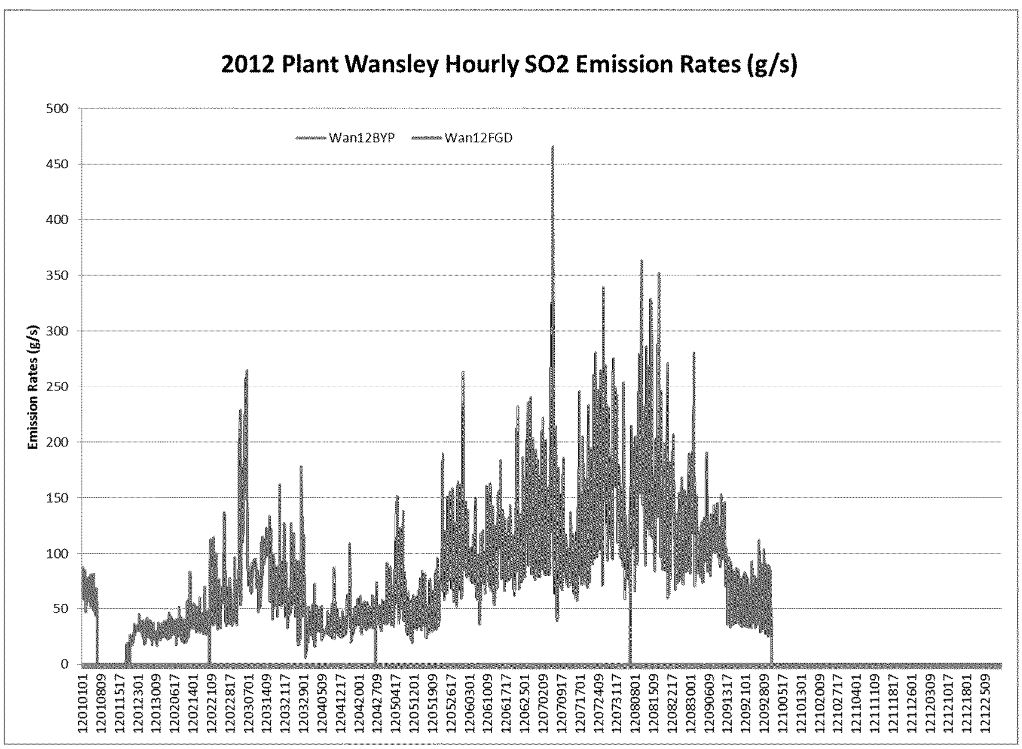

Figure 2. Hourly (2012) SO_2 emission rates (g/s) modeled through each stack for Plant Wansley.

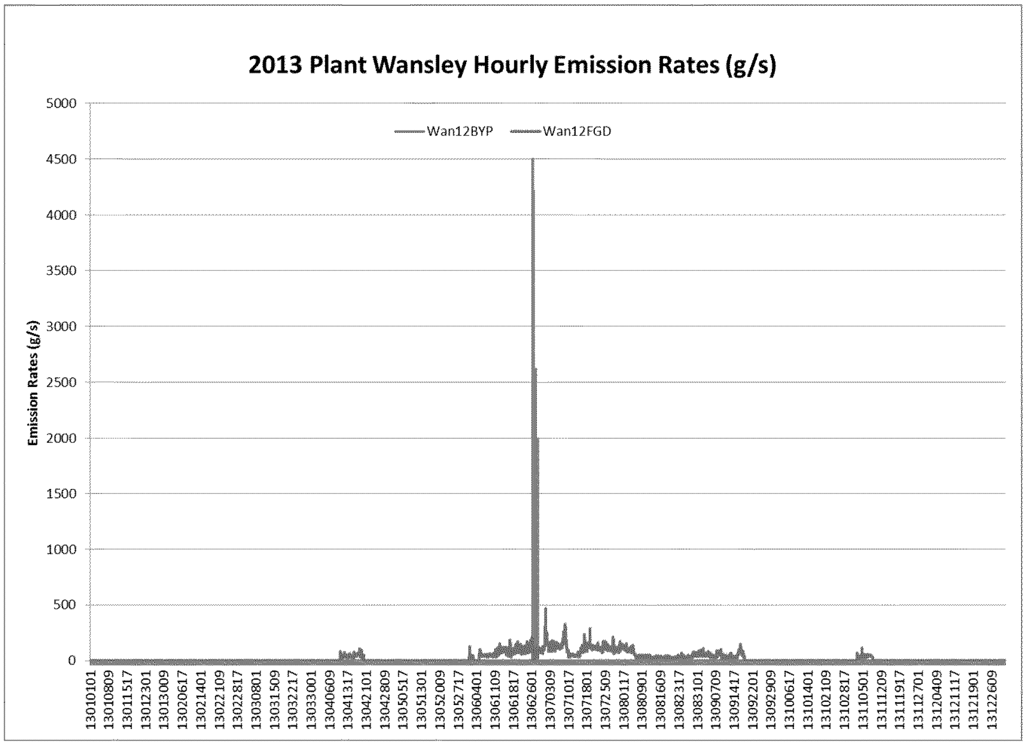

Figure 3. Hourly (2013) SO_2 emission rates (g/s) modeled through each stack for Plant Wansley.

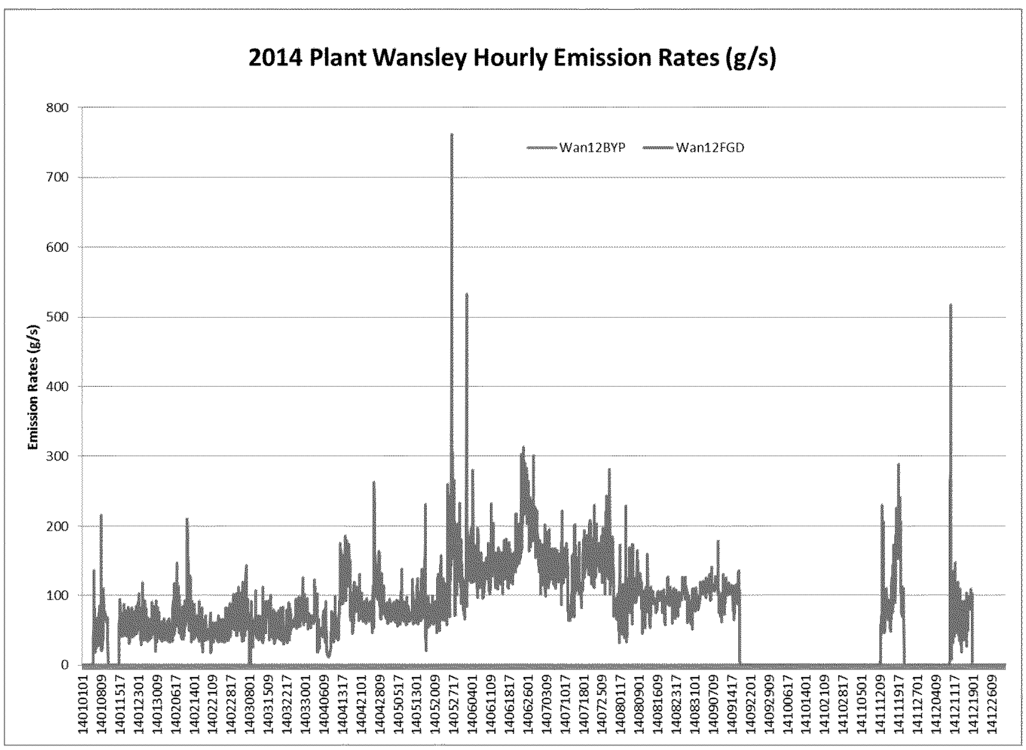

Figure 4. Hourly (2014) SO_2 emission rates (g/s) modeled through each stack for Plant Wansley.

1-HOUR SO_2 NAAQS ASSESSMENT

The total SO_2 concentrations were calculated as the sum of the modeled concentrations due to SO_2 emissions from Plant Wansley, SO_2 emissions from the offsite sources, and the 2012-2014 background SO_2 concentration of 5 ppb (13.1µg/m^3). AERMOD (version 15181) was used to model the 1st, 2nd, 3rd, and 4th highest three-year average of 1-hour SO_2 concentrations (Table 1). Figure 5 shows a Google Earth map for Plant Wansley. As seen in Figure 6, the 4th high daily maximum 1-hour SO_2 concentration averaged over 3-years was located at approximately 2.62 kilometers northeast of Plant Wansley.

The highest 4th high 1-hour SO_2 concentration averaged over three years including the modeled SO_2 impacts from Plant Wansley and the offsite sources (10 ppb = 25.2 µg/m^3) and the background SO_2 concentration (5 ppb = 13.1 µg/m^3) is 15 ppb (38.3 µg/m^3). As shown in Table 2, this value is well below the NAAQS level of 75 ppb (196 µg/m^3).

Table 1. Summary of highest 1-hour SO_2 modeled impacts averaged over 3 model years.

Rank	**3-year Average (ppb)**	2012 (ppb)	2013 (ppb)	2014 (ppb)	Receptor (lat, log)	Distance from Plant Wansley (km)
1st High	28	16	52	17	33.4218, -84.9940	3.71
2nd High	23	17	38	13	33.4183, -85.0027	2.83
3rd High	17	14	21	16	33.4283, -85.0090	2.83
4th High	**15**	13	18	13	33.4238, -85.0080	2.62

Table 2. Summary of 1-hour SO2 NAAQS (µg/m^3) analysis

Pollutant	Averaged Period	Model Design Concentration excluding background	Annual Background Concentration	Total Concentration	NAAQS	Below NAAQS (Y/N)
SO_2	1-hour	10 ppb	5 ppb	**15 ppb**	75 ppb	Yes
SO_2	1-hour	25.2 µg/m^3	13.1 µg/m^3	38.3 µg/m^3	196 µg/m^3	Yes

Figure 5. Google Earth map for Plant Wansley.

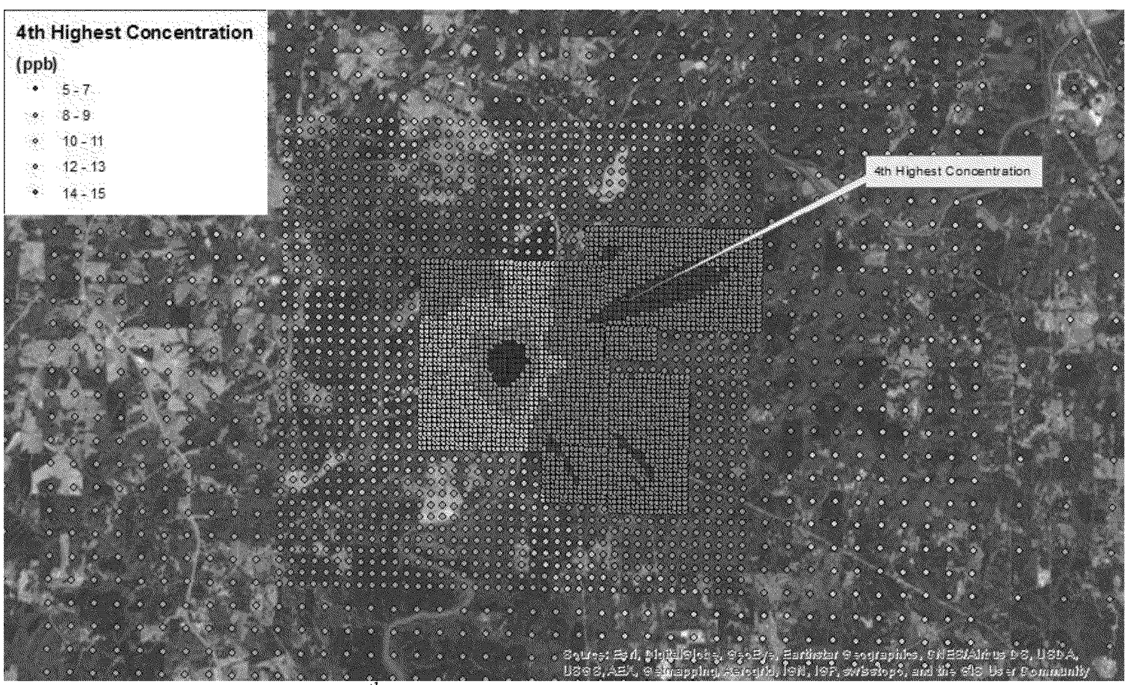

Figure 6. Spatial plot of the 4^{th} highest daily maximum 1-hour SO_2 concentration averaged over 3 years (2012-2014).

CONCLUSIONS

The Georgia Power Plant Wansley dispersion modeling for the 1-hour SO_2 NAAQS designations was conducted in accordance with the final Data Requirements Rule (DRR) and Modeling Technical Assistance Document (TAD) using the most recently available information. As seen in Table 2, SO_2 emissions from Plant Wansley do not cause or contribute to any violations of the 1-hour SO_2 NAAQS in the vicinity of Georgia Power Plant Wansley. This result demonstrates attainment of the 1-hour SO_2 NAAQS in the area surrounding the Plant Wansley.

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404-363-7000

December 28, 2016

Ms. Beverly Banister, Director
Air, Pesticides and Toxics Management Division
U.S. EPA, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303-8909

RE: Georgia Power-Plant Wansley Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO_2 NAAQS

Dear Ms. Banister:

On June 8, 2016, the Georgia Environmental Protection Division (EPD) submitted a letter to EPA describing the approach that will be used to characterize air quality at sources in Georgia that had annual actual SO_2 emissions exceeding 2,000 tons per year (tpy) in 2014. In that letter, EPD stated that Georgia Power-Plant Wansley would be characterized with air quality modeling.

A modeling protocol was submitted to EPA on June 17, 2016 and updated on September 27 . This submittal contains three items: (1) a modeling report submitted by Georgia Power to EPD; (2) a final modeling report created by EPD; and (3) a copy of all modeling inputs/output files on a DVD.

Should you or your staff have any questions or comments, please feel free to contact Jim Boylan at James.Boylan@dnr.ga.gov or 404-363-7014.

Sincerely,

Karen Hays

Karen D. Hays, P.E.
Chief, Air Protection Branch
Georgia Environmental Protection Division

c: Scott Davis (Davis.ScottR@epa.gov), EPA Region 4
Gregg Worley (Worley.Gregg@epa.gov), EPA Region 4
Lynorae Benjamin (Benjamin.Lynorae@epa.gov), EPA Region 4
Todd Rinck (Rinck.Todd@epa.gov), EPA Region 4

Attachments

Environmental Affairs
Bin 10221
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374

November 18, 2016

GEORGIA POWER
A SOUTHERN COMPANY

James W. Boylan, Ph.D.
Planning & Support Program
Georgia Department of Natural Resources
Environmental Protection Division – Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, GA 30354

Re: Georgia Power Plant Wansley, Data Requirements for Characterizing Air Quality for the Primary 1-hour SO_2 National Ambient Air Quality Standard

Dear Dr. Boylan,

This is to submit modeled air quality data in the vicinity of Georgia Power Plant Wansley characterizing maximum 1-hour ambient concentrations of sulfur dioxide (SO_2) under the Data Requirements Rule ("DRR") in 40 C.F.R. Part 51 Subpart BB. The air quality data is based on dispersion modeling conducted in accordance with (1) the April 1, 2016 modeling protocol, (2) the June 14, 2016 modeling protocol addendum, and (3) the September 27, 2016 modeling protocol update addressing comments from EPA's technical review of the protocol and addendum. Based on the modeled air quality data (included in the electronic files on the attached compact disc), SO_2 emissions from Plant Wansley do not cause or contribute to any violations of the 1-hour SO_2 NAAQS.

The following discusses the procedures used to support the dispersion modeling.

<u>Meteorological Input Data</u>

Since no onsite meteorological data was available, hourly surface and upper air observations from the Peachtree City-Falcon Field national weather service station for the period 2012-2014 were used in the modeling. The data were judged by GA EPD to be representative (i.e., no significant difference in surface characteristics in the areas surrounding the surface station and plant site) and provided in a preprocessed AERMOD model-ready format using the AERMET (v14134) processor.

<u>Source Input Data</u>

For Plant Wansley, actual hourly emissions, temperatures, and exhaust flow rates for the most recent three calendar years (2012-2014) were modeled. The emissions and exhaust flow rates used to develop the source input data are the same as those reported to the EPA Clean Air Markets Division under the Acid Rain Program ("ARP") using continuous emissions monitoring systems ("CEMS") certified according to 40 C.F.R Part 75. The physical source parameters (e.g., actual stack heights, exhaust configuration, etc.), and other information relevant to the representation of the point sources at Plant Wansley are described in the April 1, 2016 modeling protocol. Figures 1-3 show the actual hourly SO_2 emission rates (lb/hr) that were modeled through each stack for 2012, 2013, and 2014.

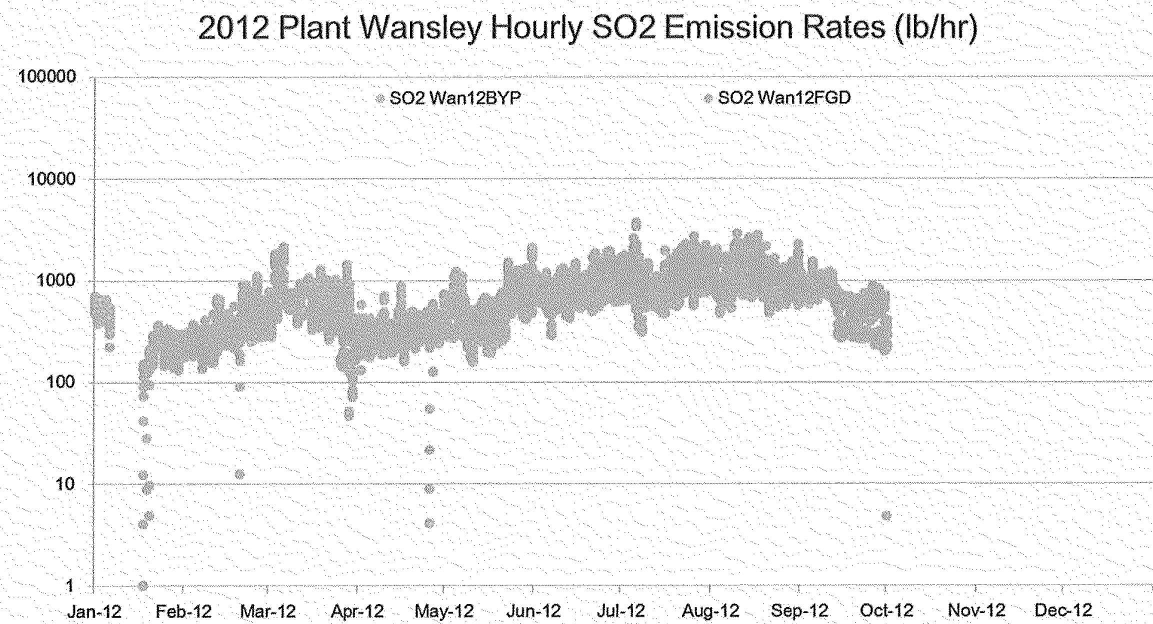

Figure 1. Hourly (2012) SO_2 emission rates for each modeled point source at Plant Wansley

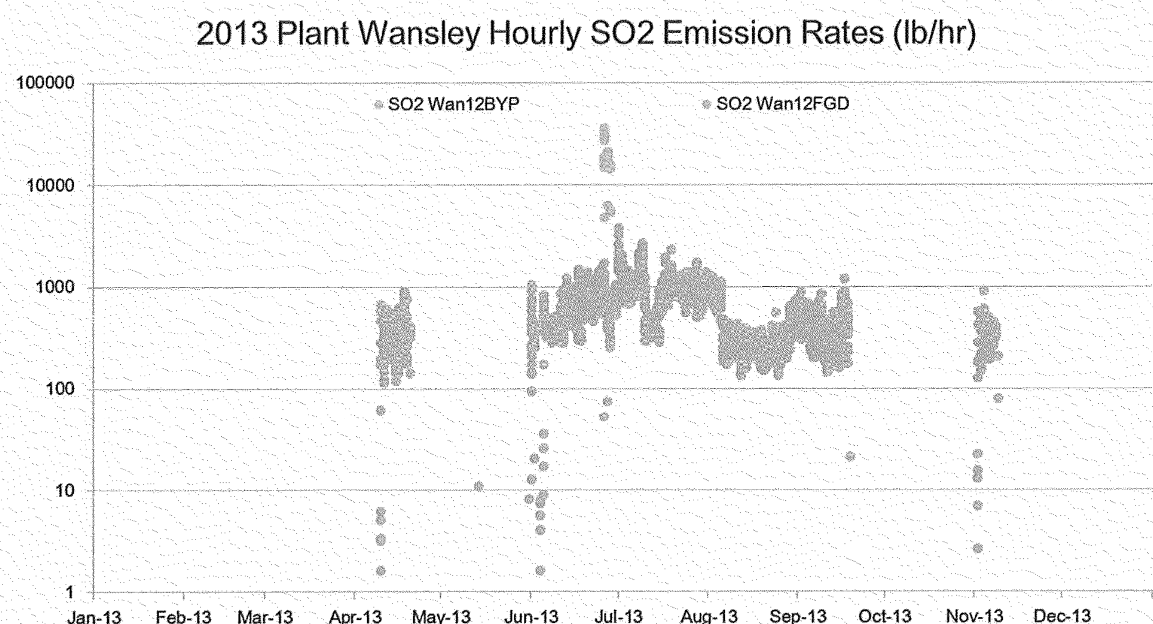

Figure 2. Hourly (2013) SO_2 emission rates for each modeled point source at Plant Wansley

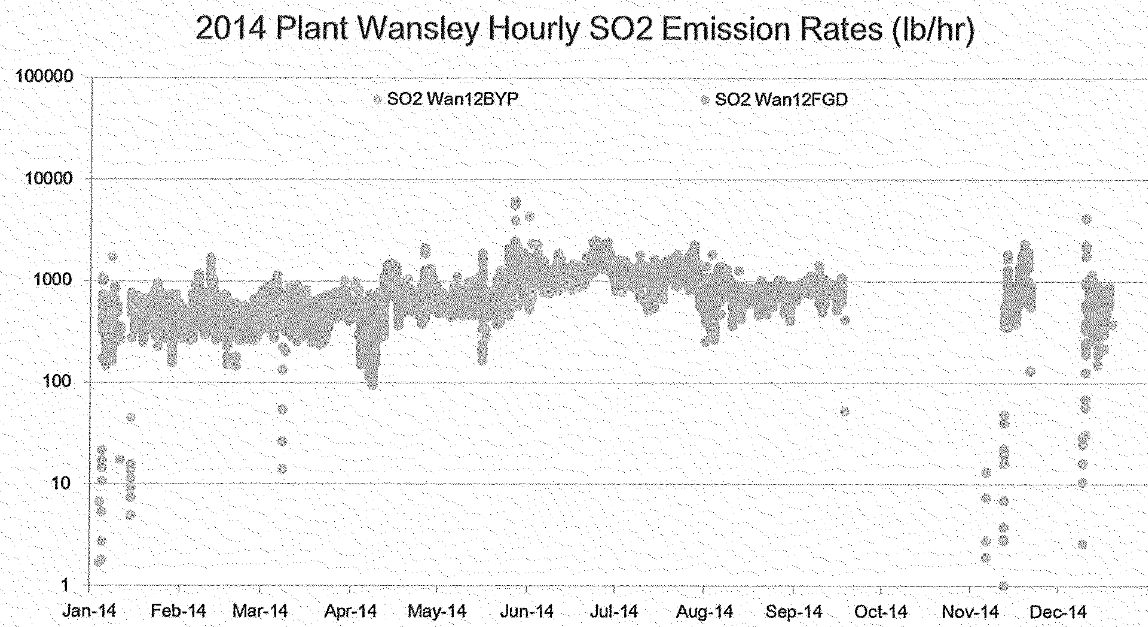

Figure 3. Hourly (2014) SO_2 emission rates for each modeled point source at Plant Wansley

In addition to the two coal-fired units at Plant Wansley, the following offsite SO_2 sources were included in the modeling analysis in accordance with the protocol addendum and update.

- Natural gas-fired Units 6 and 7 at Plant Yates,
- Natural gas-fired combined-cycle Blocks 6 and 7 owned by Southern Power Company ("SPC") at the Wansley Combined-Cycle Generating Plant,
- Natural gas-fired combined-cycle Block 8 owned by Oglethorpe Power Corporation ("OPC") at the Chattahoochee Energy Facility, and
- Natural gas-fired combined-cycle Block 9 owned by the Municipal Electric Authority of Georgia ("MEAG Power").

Plant Yates Units 1, 2, 3, 4, and 5 are not included in the model since these units were retired on April 15, 2015. Please refer to the attached Retired Unit Exemption forms submitted to EPA under the Acid Rain Program, 40 C.F.R. §72.8. Additionally, the retired units will be removed from the Plant Yates Title V operating permit upon renewal (Application # 23087, submitted January 26, 2015).

The modeled source input data for the above sources are listed in Tables 1 through 4 below. For these sources, allowable or PTE emissions of SO_2 were modeled. Therefore, GEP stack heights were used. Information for the SPC, OPC, and MEAG Power combined-cycle units was obtained from the Georgia PSD Modeling Inventory available online at https://psd.georgiaair.org/inventory/.

Table 1. Georgia Power Plant Yates Unit 6-7

ID	UTM East (m)	UTM North (m)	Elev. (ft)	Height (ft)	Dia. (ft)	Temp. (F)	Vel. (fps)	SO_2 (lb/hr)
Yat67	695,303	3,704,514	759	485.9	22.7	260	67	4.2

Please note that Plant Yates Units 6 and 7 exhaust to single stack which is equipped with two flues, one for each unit. Dual-flue stacks have distinct emission points close enough together such that they will result in a merged plume. Please refer to the discussion of modeling such emissions points in the April 1, 2016 modeling protocol.

Table 2. Southern Power Wansley Combined-Cycle Generating Plant

ID	UTM East (m)	UTM North (m)	Elev. (ft)	Height (ft)	Dia. (ft)	Temp. (F)	Vel. (fps)	SO_2 (lb/hr)
SPC6A	682,529	3,698,011	750	132	16.8	198	87	1.50
SPC6B	682,556	3,697,983	750	132	16.8	198	87	1.50
SPC7A	682,436	3,698,100	750	132	16.8	198	87	1.50
SPC7B	682,464	3,698,075	750	132	16.8	198	87	1.50

Table 3. Oglethorpe Power Corporation Chattahoochee Energy Facility

ID	UTM East (m)	UTM North (m)	Elev. (ft)	Height (ft)	Dia. (ft)	Temp. (F)	Vel. (fps)	SO_2 (lb/hr)
OPC8A	682,408	3,698,122	750	130	16.5	205	65	1.22
OPC8B	682,385	3,698,143	750	130	16.5	205	65	1.22

Table 4. Municipal Electric Authority of Georgia

ID	UTM East (m)	UTM North (m)	Elev. (ft)	Height (ft)	Dia. (ft)	Temp. (F)	Vel. (fps)	SO_2 (lb/hr)
MEAG9A	682,299	3,698,259	750	132	19.0	181	54	1.50
MEAG9B	682,268	3,698,287	750	132	19.0	181	54	1.50

Receptor Locations

A Cartesian receptor grid extending to approximately 20 km from Plant Wansley in all directions was used in the modeling analysis. The receptors were placed according to the following configuration:

- 100 meter spacing out to 2 km,
- 250 meter spacing from 2 km out to 5 km,
- 500 meter spacing from 5 km our to 10 km, and
- 1,000 meter spacing from 10 km out to 20 km.

Then, all areas of maximum impact were resolved to 100 meter spacing.

Building Downwash

The effects of building downwash were incorporated into the modeling analysis. Direction-specific building downwash parameters required by AERMOD were developed using BPIP PRIME (04274).

Offsite Emissions Inventory

All offsite sources of SO_2 not modeled are adequately represented by the background concentration included in the modeling analysis. Please refer to the June 14, 2016 modeling protocol addendum for discussion regarding the representativeness of the background concentration.

2010 SO_2 NAAQS Assessment

As part of the modeling analysis, background was added to the modeled concentrations to assess compliance with the 1-hour SO_2 NAAQS. The 2013-2015 design value for the South DeKalb monitor (13-089-002), 5 ppb (13.1 µg/m3), was used as the background concentration. Please refer to the June 14, 2016 modeling protocol addendum. The total SO_2 concentrations were calculated as the sum of the modeled design concentration from Plant Wansley and the offsite sources and the background concentration. The modeled design concentration was calculated by AERMOD (v14134) and reflects the 3-year average of the 99th-percentile daily maximum 1-hour SO_2 concentrations. The modeling results are presented in Table 5 below and show that the 4th highest daily 1-hour concentration averaged over 3 years, including background, is 21 ppb. This value is well below the NAAQS level of 75 ppb.

Table 5. Summary of highest 1-hour SO_2 modeled impacts averaged over 3 years, including background

Rank	**3-year Average (ppb)**	2012 (ppb)	2013 (ppb)	2014 (ppb)	Receptor (lat, long)	Distance from Plant Wansley (km)
1st	35	22.5	58.6	23.9	33.4218, -84.9930	3.93
2nd	29	23.8	44.6	19.8	33.4183, -85.0017	3.06
3rd	23	20.4	27.2	22.2	33.4284, -85.0090	2.89
4th	**21**	19.8	24.1	19.7	33.4239, -85.0081	2.70

Should you or your staff have any questions, please contact Jon Bandzul at (404) 506-3458.

Sincerely,

Rosa Chi
Environmental Affairs Manager

Cc: Di Tian, Georgia Environmental Protection Division
Jon Bandzul, Georgia Power Company
Justin Walters, Southern Company
Travis Hicks, Southern Company

Enc/

To: Banister, Beverly[Banister.Beverly@epa.gov]; Davis, Scott[Davis.ScottR@epa.gov]; Worley, Gregg[Worley.Gregg@epa.gov]; Benjamin, Lynorae[benjamin.lynorae@epa.gov]; Rinck, Todd[Rinck.Todd@epa.gov]; Bradley, Twunjala[Bradley.Twunjala@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Howard, Chris[Howard.Chris@epa.gov]; Krivo, Stan[Krivo.Stanley@epa.gov]
Cc: Munsey, Elisabeth[Elisabeth.Munsey@dnr.ga.gov]; Tian, Di[Di.Tian@dnr.ga.gov]; Kim, Yunhee[Yunhee.Kim@dnr.ga.gov]; Hays, Karen[Karen.Hays@dnr.ga.gov]; Kuoh, Dika[Dika.Kuoh@dnr.ga.gov]
From: Boylan, James
Sent: Wed 12/28/2016 7:50:21 PM
Subject: Plant Bowen Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO2 NAAQS
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A total of three (3) attachments are included:

(1) a copy of the cover letter from Ms. Karen Kays (EPD) to Ms. Beverly Banister (EPA),

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Sincerely,

Jim Boylan

James W. Boylan, Ph.D.

Manager, Planning & Support Program

Georgia Department of Natural Resources

Environmental Protection Division - Air Protection Branch

4244 International Parkway, Suite 120

Atlanta, GA 30354

Office: 404-363-7014   Fax: 404-363-7100

E-mail: James.Boylan@dnr.ga.gov

Environmental Affairs
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241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374

November 18, 2016

GEORGIA POWER
A SOUTHERN COMPANY

James W. Boylan, Ph.D.
Planning & Support Program
Georgia Department of Natural Resources
Environmental Protection Division – Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, GA 30354

Re: Georgia Power Plant Bowen, Data Requirements for Characterizing Air Quality for the Primary 1-hour SO_2 National Ambient Air Quality Standard

Dear Dr. Boylan,

This is to submit modeled air quality data in the vicinity of Georgia Power Plant Bowen characterizing maximum 1-hour ambient concentrations of sulfur dioxide (SO_2) under the Data Requirements Rule ("DRR") in 40 C.F.R. Part 51 Subpart BB. The air quality data is based on dispersion modeling conducted in accordance with (1) the April 1, 2016 modeling protocol, (2) the June 14, 2016 modeling protocol addendum, and (3) the September 27, 2016 modeling protocol update addressing comments from EPA's technical review of the protocol and addendum. Based on the modeled air quality data (included in the electronic files on the attached compact disc), SO_2 emissions from Plant Bowen do not cause or contribute to any violations of the 1-hour SO_2 NAAQS.

The following discusses the procedures used to support the dispersion modeling.

<u>Meteorological Input Data</u>

Since no onsite meteorological data was available, hourly surface and upper air observations from the Cartersville Airport and Peachtree City national weather service stations for the period 2012-2014 were used in the modeling. The data were judged by GA EPD to be representative (i.e., no significant difference in surface characteristics in the areas surrounding the surface station and plant site) and provided in a preprocessed AERMOD model-ready format using the AERMET (v14134) processor.

<u>Source Input Data</u>

Actual hourly emissions, temperatures, and exhaust flow rates for the most recent three calendar years (2012-2014) were modeled. The emissions and exhaust flow rates used to develop the source input data are the same as those reported to the EPA Clean Air Markets Division under the Acid Rain Program using continuous emissions monitoring systems certified according to 40 C.F.R Part 75. The physical source parameters (e.g., actual stack heights, exhaust configuration, etc.), and other information relevant to the representation of the point sources at Plant Bowen are described in the April 1, 2016 modeling protocol. Figures 1-3 show the actual hourly SO_2 emission rates (lb/hr) that were modeled through each stack for 2012, 2013, and 2014.

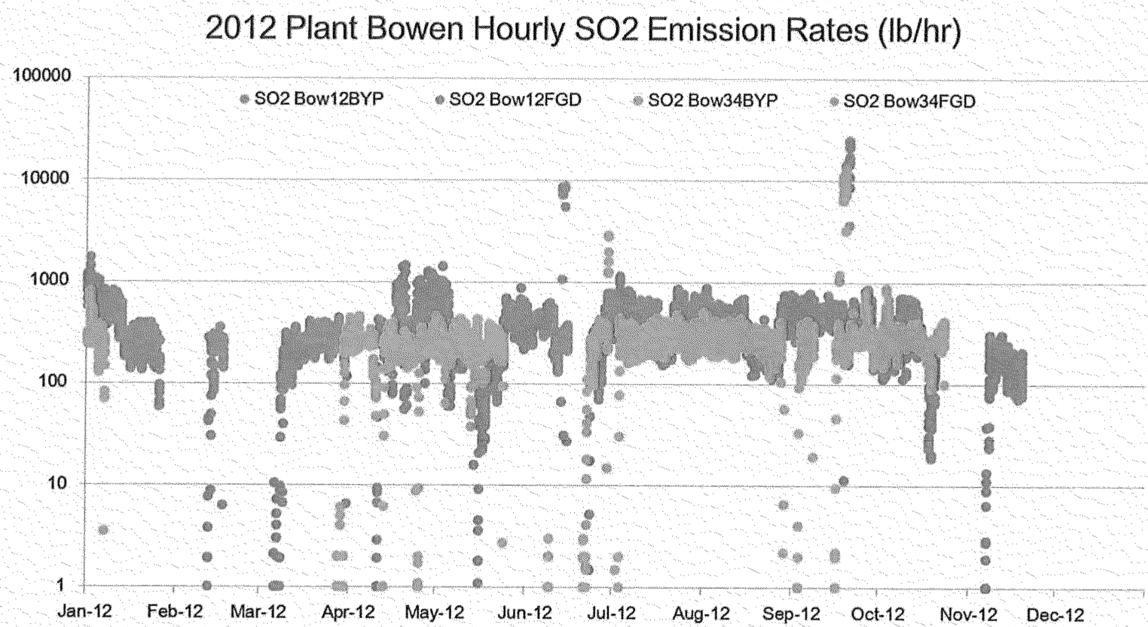

Figure 1. Hourly (2012) SO_2 emission rates for each modeled point source at Plant Bowen

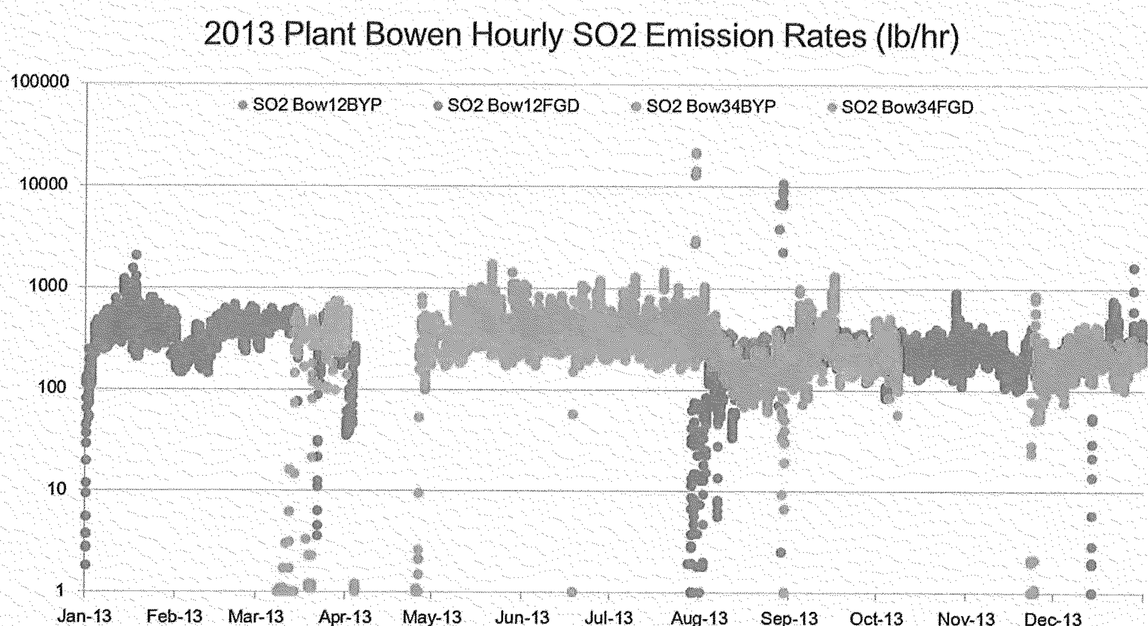

Figure 2. Hourly (2013) SO_2 emission rates for each modeled point source at Plant Bowen

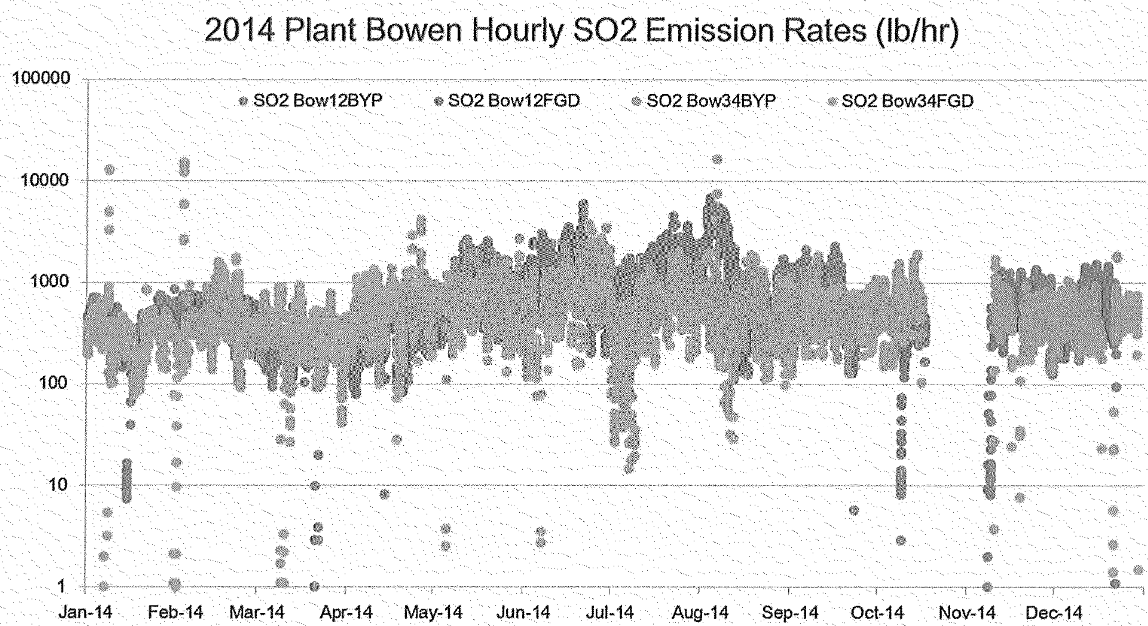

Figure 3. Hourly (2014) SO_2 emission rates for each modeled point source at Plant Bowen

Receptor Locations

A Cartesian receptor grid extending to approximately 20 km from Plant Bowen in all directions was used in the modeling analysis. The receptors were placed according to the following configuration:

- 100 meter spacing out to 2 km,
- 250 meter spacing from 2 km out to 5 km,
- 500 meter spacing from 5 km our to 10 km, and
- 1,000 meter spacing from 10 km out to 20 km.

Then, all areas of maximum impact were resolved to 100 meter spacing.

Building Downwash

The effects of building downwash were incorporated into the modeling analysis. Direction-specific building downwash parameters required by AERMOD were developed using BPIP PRIME (04274).

Offsite Emissions Inventory

All offsite sources of SO_2 not modeled are adequately represented by the background concentration included in the modeling analysis. Please refer to the June 14, 2016 modeling protocol addendum and September 27, 2016 modeling protocol update for additional discussion regarding the inclusion of additional offsite sources in the modeling analysis.

2010 SO_2 NAAQS Assessment

As part of the modeling analysis, background was added to the modeled concentrations to assess compliance with the 1-hour SO_2 NAAQS. The 2013-2015 design value for the Rome monitor (13-115-0003), 35 ppb (91.6 μg/m3), was used as the "first-tier" background concentration. Please refer to the September 27, 2016 modeling protocol update. The total SO_2 concentrations were calculated as the sum of the modeled design concentration from Plant Bowen and the background concentration. The modeled design concentration was calculated by AERMOD (v14134) using actual hourly emissions from 2012-2014 and reflects the 3-year average of the 99th-percentile daily maximum 1-hour SO_2 concentrations. The modeling results are presented in Table 1 below and show that the 4th highest daily 1-hour concentration averaged over 3 years, including background, is 55 ppb. The contribution of Plant Bowen, in-and-of itself, was only 20 ppb. This value is well below the NAAQS level of 75 ppb.

Table 1. Summary of highest 1-hour SO_2 modeled impacts averaged over 3 years, including background

Rank	**3-year Average (ppb)**	2012 (ppb)	2013 (ppb)	2014 (ppb)	Receptor (lat, long)	Distance from Plant Bowen (km)
1st	94	104	70	108	34.1092, -84.9267	1.85
2nd	69	68	51	89	34.1063, -84.9133	2.3
3rd	62	63	49	73	34.1009, -84.9134	2.85
4th	**55**	46	44	76	34.1053, -84.9090	2.55

Should you or your staff have any questions, please contact Jon Bandzul at (404) 506-3458.

Sincerely,

Rosa Chi
Environmental Affairs Manager

Cc: Di Tian, Georgia Environmental Protection Division
Jon Bandzul, Georgia Power Company
Justin Walters, Southern Company
Travis Hicks, Southern Company

Enc/

GA EPD Dispersion Modeling for the 2010 1-Hour SO_2 NAAQS: Georgia Power - Plant Bowen December 28, 2016

Georgia Power's Plant Bowen is an affected source under EPA's Data Requirements Rule (DRR) because Plant Bowen emitted greater than 2,000 tons of SO_2 in 2014. To satisfy the requirements of the DRR, Georgia Power notified Georgia EPD that they will characterize air quality through the modeling option and submitted a dispersion modeling report and related modeling files on November 18, 2016. Dispersion modeling was conducted by Georgia Power. Georgia EPD reviewed the modeling report and files to ensure that the dispersion modeling was conducted in accordance with the final DRR and Modeling Technical Assistance Document (TAD).

This report discusses the procedures used to review the supporting dispersion modeling and the modeling results.

INPUT DATA

Meteorological Data – Since no on-site meteorological data was available, the hourly meteorological data of surface and upper air observations from the Cartersville Airport, GA (surface) and Peachtree City Airport, GA (upper) NWS stations for the period of 2012-2014 was used in this modeling. One-minute data (TD-6405 format) for June-December, 2013 for the Cartersville Airport station (KVPC) are missing. GA EPD developed two versions of the 2013 meteorological data, "version 1" used one-minute data for KCHA (Lovell Field Airport) station to fill in the missing 1-minute data and "version 2" used 5-minute data (TD-6401 format) for KVPC to fill in the missing data. The 2013 version 1 meteorological data was used in dispersion modeling conducted by Georgia Power. The 2013 version 2 meteorological data was used in dispersion modeling conducted by Georgia EPD. Therefore, different modeling results between Georgia Power and GA EPD is expected. This report uses the results from the GA EPD modeling (version 2).

The meteorological data was compiled and provided by GA EPD. The AERMET processor (15181) was used to convert the NWS data into AERMOD model-ready meteorological data files using the AERSURFACE surface characteristics evaluation utility (13016). Values of the surface characteristics (albedo, Bowen ratio, and surface roughness) surrounding the Cartersville Airport, GA NWS surface station and the project site were derived for each of twelve 30-degree sectors over four seasons in accordance with the AERMOD Implementation Guide (09078). GA EPD compared the above AERSURFACE generated surface characteristics and found no significant differences in the albedo, Bowen ratio, and surface roughness for the two sites.

Therefore, a meteorological dataset with the Cartersville airport NWS surface characteristics was used in the modeling. According to the 3-year wind rose for the Cartersville Airport (Figure 1), the winds are predominantly from the east.

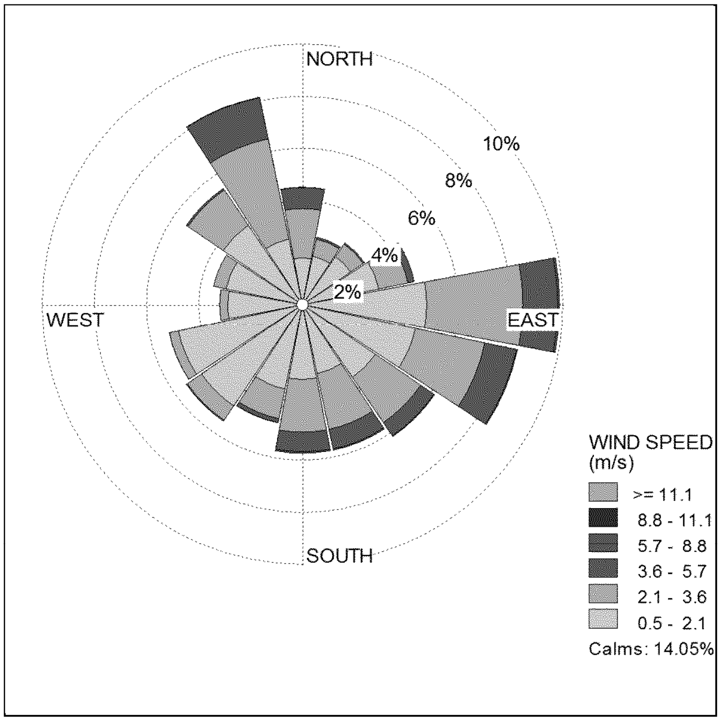

Figure 1. Three-year wind rose (2012-2014) for the Cartersville Airport.

Source Data – Plant Bowen is an electric power generation plant with four supercritical pulverized coal-fired boilers (Units 1, 2, 3, and 4). Each unit is equipped with a wet flue gas desulfurization (FGD) system for SO_2 emissions control. During normal operations, the units will exhaust through the two 675-foot scrubber stacks: one stack (BOW12FGD) serves Units 1 and 2 (each with its own flue) and the other stack (BOW34FGD) serves Units 3 and 4 (each with its own flue). However, there may be some periods of time during which a scrubber is not in operation. In these cases, the units will exhaust through one of two 1000-foot bypass stacks that were in existence prior to installation of the scrubbers: one stack (BOW12BYP) serves Units 1 and 2 (each with its own flue) and the other stack (BOW34BYP) serves Units 3 and 4 (each with its own flue).

Actual hourly emissions, temperatures, and flow rates for the most recent three calendar years (2012-2014) were used in the modeling. This information was reported to EPA's Clean Air Markets Division (CAMD) under the Acid Rain Program using continuous emission monitoring systems (CEMS) certified according to 40 CFR Part 75. Figures 2-4 show the hourly SO_2 emission rates (g/s) that were modeled through each stack for BOW12BYP, BOW12FGD, BOW34BYP, and BOW34FGD in 2012, 2013, and 2014.

Receptor Locations – A comprehensive Cartesian receptor grid extending to approximately 20 km from the Plant Bowen in all directions was used in the AERMOD modeling analysis to assess ground-level SO_2 concentrations. The Cartesian receptors were placed according to the following configuration based on the center of the Plant Bowen:

- 0 km – 2km ➔ 100 meters apart
- 2 km – 5 km ➔ 250 meters apart
- 5 km – 10 km ➔ 500 meters apart
- 10 km – 20 km ➔ 1,000 meters apart

This domain is sufficient to capture the maximum impact. Receptors were also placed at 100-m intervals within Plant Bowen's ambient air boundary. Although the SO_2 Modeling TAD specifies that receptors need not be placed at locations where it is not feasible to place a monitor (e.g., water bodies and within facility property lines), the receptor grid conservatively simulates all areas including within the facility's ambient air boundary that is not generally accessible to the public. This receptor grid represents a very conservative approach to the modeling analysis. All receptor locations are represented in the Universal Transverse Mercator projections, Zone 16, North American Datum 1983.

Terrain Elevation – Terrain data from USGS 1-sec National Elevation Dataset (NED) CONUS were extracted to obtain the elevations of receptors by AERMAP terrain processor (version 11103). The resulting elevation data were verified by comparing contoured receptor elevations with USGS 7.5-minute topographic map contours.

Building Downwash – The effects of building downwash were incorporated into the AERMOD analysis. Direction-specific building parameters required by AERMOD were developed using the BPIP PRIME utility (version 04274).

Offsite Emission Inventory and Background – No offsite sources are included in the modeling analysis and the 2013-2015 design value for the Rome Monitor (13-115-003) of 35 ppb (91.6 $\mu g/m^3$) is used as a background SO_2 concentration. Detailed information can be found in the previously submitted June 17, 2016 modeling protocol addendum and the September 27, 2016 modeling protocol update.

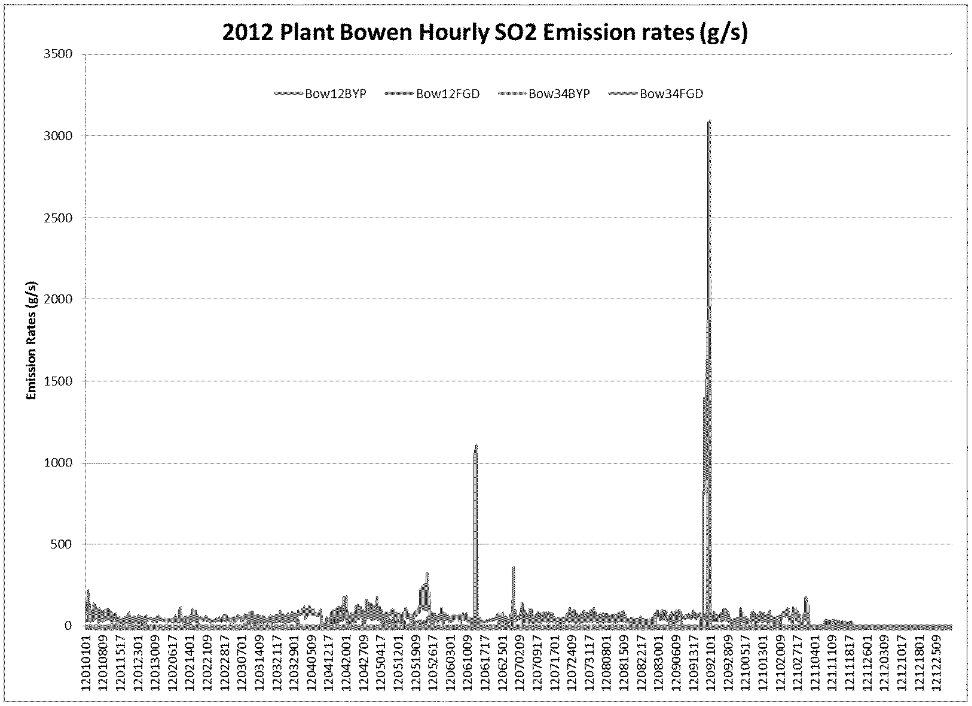

Figure 2. Hourly (2012) SO_2 emission rates (g/s) modeled through each stack for Georgia Power Plant Bowen.

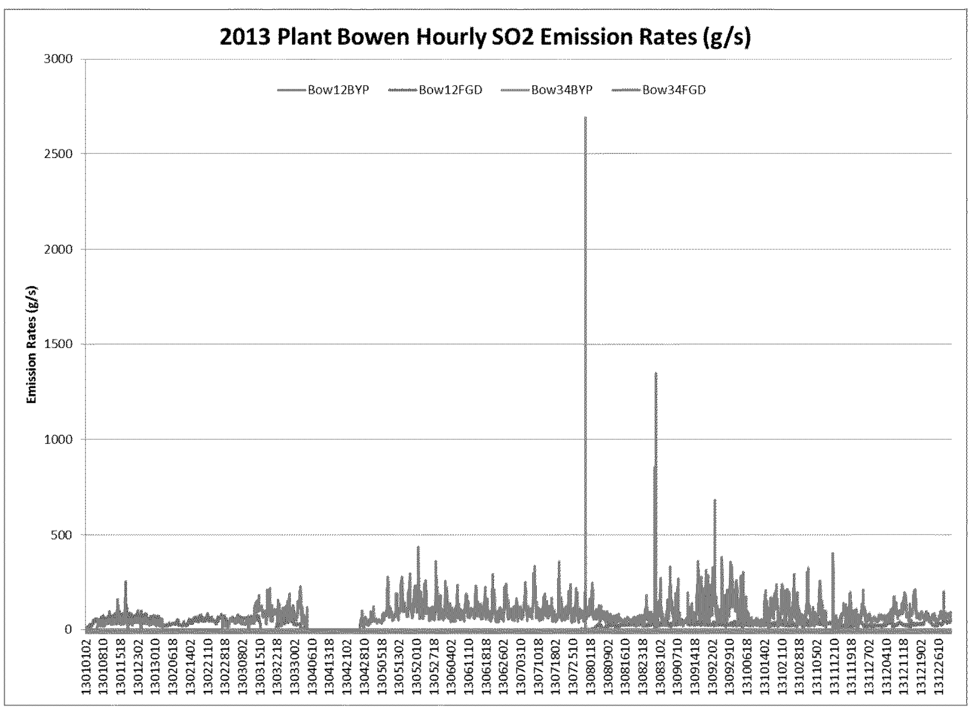

Figure 3. Hourly (2013) SO_2 emission rates (g/s) modeled through each stack for Georgia Power Plant Bowen.

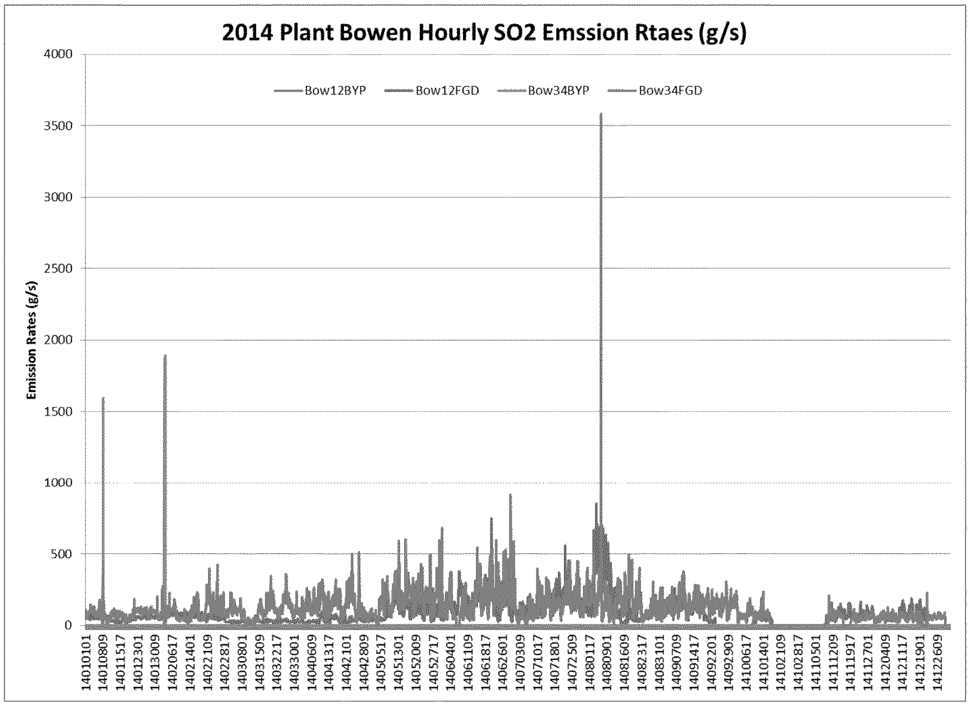

Figure 4. Hourly (2014) SO_2 emission rates (g/s) modeled through each stack for Georgia Power Plant Bowen.

1-HOUR SO_2 NAAQS ASSESSMENT

The total SO_2 concentrations were calculated as the sum of the modeled concentrations due to SO_2 emissions from Plant Bowen and the background SO_2 concentration of 35 ppb (91.6 $\mu g/m^3$). AERMOD (version 15181) was used to model the 1^{st}, 2^{nd}, 3^{rd}, and 4^{th} highest three-year average of 1-hour SO_2 concentrations (Table 1). Figure 5 shows a Google Earth map for Plant Bowen. As seen in Figure 6, the 4^{th} high daily maximum 1-hour SO_2 concentration averaged over 3-years for SO_2 was located at approximately 2.34 kilometers south of Plant Bowen.

The highest 4^{th} high 1-hour SO_2 concentration averaged over three years including the modeled SO_2 impacts from Plant Bowen (21 ppb = 54.3 $\mu g/m^3$) and the background SO_2 concentration from the Rome monitor (35 ppb = 91.6 $\mu g/m^3$) is 56 ppb (145.9 $\mu g/m^3$). As shown in Table 2, this value is well below the NAAQS level of 75 ppb (196 $\mu g/m^3$).

Table 1. Summary of 1st, 2nd, 3rd, and 4th highest 1-hour SO_2 modeled impacts averaged over 3 years (2012-2014).

Rank	**3-year Average (ppb)**	2012 (ppb)	2013 (ppb)	2014 (ppb)	Receptor (lat, log)	Distance from Plant Bowen (km)
1st High	87	100	48	113	34.1100, -84.9266	1.81
2nd High	69	68	49	90	34.1071, -84.9143	2.17
3rd High	61	63	46	75	34.1009, -84.9134	2.85
4th High	**56**	46	45	76	34.1071, -84.9100	2.34

Table 2. Summary of 1-hour SO_2 NAAQS analysis.

Pollutant	Averaged Period	Model Design Concentration excluding background	Monitored Background Concentration	Total Concentration	NAAQS	Below NAAQS (Y/N)
SO_2	1-hour	21 ppb	35 ppb	**56 ppb**	75 ppb	Yes
SO_2	1-hour	54.3 μg/m^3	91.6 μg/m^3	145.9 μg/m^3	196 μg/m^3	Yes

Figure 5. Google Earth map for Plant Bowen.

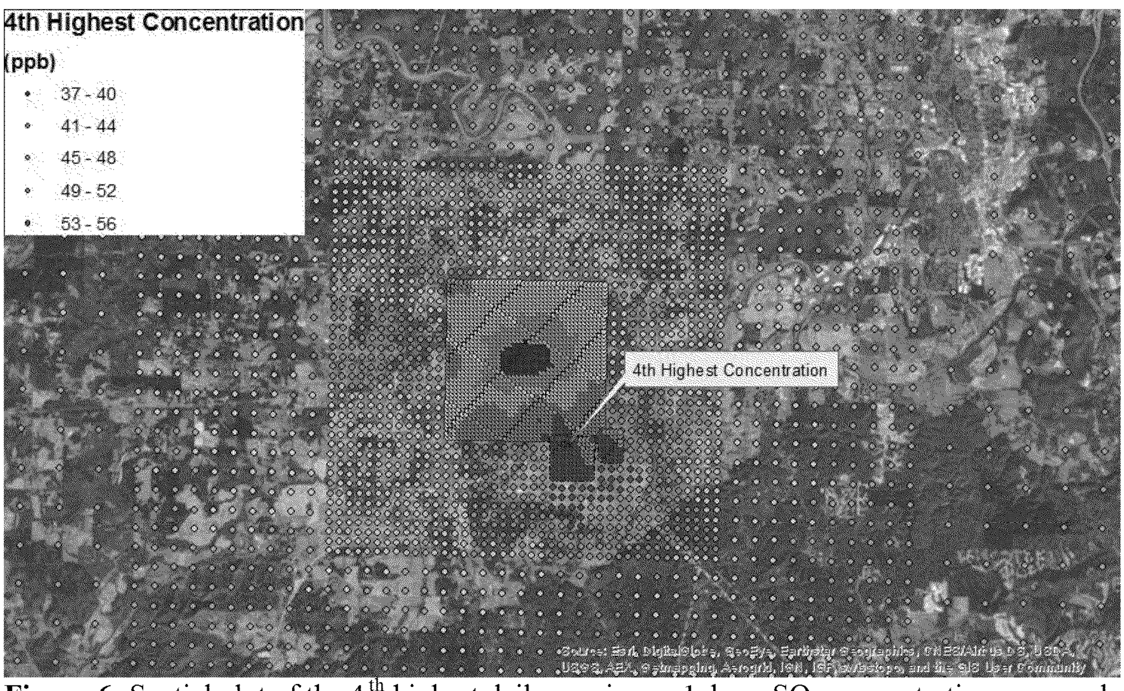

Figure 6. Spatial plot of the 4^{th} highest daily maximum 1-hour SO_2 concentration averaged over 3 years.

CONCLUSIONS

The Georgia Power Plant Bowen dispersion modeling for the 1 -hour SO_2 NAAQS designations was conducted in accordance with the final Data Requirements Rule (DRR) and Modeling Technical Assistance Document (TAD) using the most recently available information. As seen in Table 2, SO_2 emissions from Plant Bowen do not cause or contribute to any violations of the 1-hour SO_2 NAAQS. This result demonstrates attainment of the 1 -hour SO_2 NAAQS in the area surrounding the Plant Bowen.

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Air Protection Branch
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404-363-7000

December 28, 2016

Ms. Beverly Banister, Director
Air, Pesticides and Toxics Management Division
U.S. EPA, Region 4
61 Forsyth Street, SW
Atlanta, Georgia 30303-8909

RE: Georgia Power-Plant Bowen Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO_2 NAAQS

Dear Ms. Banister:

On June 8, 2 016, the Georgia Environmental Protection Division (EPD) submitted a letter to EPA describing the approach that will be used to characterize air quality at sources in Georgia that had annual actual SO_2 emissions exceeding 2,000 tons per year (tpy) in 2014. In that letter, EPD stated that Georgia Power-Plant Bowen would be characterized with air quality modeling.

A modeling protocol was submitted to EPA on June 1 7, 2016 and updated on September 27 . This submittal contains three items: (1) a modeling report submitted by Georgia Power to EPD; (2) a final modeling report created by EPD; and (3) a copy of all modeling inputs/output files on a DVD.

Should you or your staff have any questions or comments, please feel free to contact Jim Boylan at James.Boylan@dnr.ga.gov or 404-363-7014.

Sincerely,

Karen Hays

Karen D. Hays, P.E.
Chief, Air Protection Branch
Georgia Environmental Protection Division

c: Scott Davis (Davis.ScottR@epa.gov), EPA Region 4
Gregg Worley (Worley.Gregg@epa.gov), EPA Region 4
Lynorae Benjamin (Benjamin.Lynorae@epa.gov), EPA Region 4
Todd Rinck (Rinck.Todd@epa.gov), EPA Region 4

Attachments

To: Davis, Scott[Davis.ScottR@epa.gov]; Benjamin, Lynorae[benjamin.lynorae@epa.gov]; Rinck, Todd[Rinck.Todd@epa.gov]; Bradley, Twunjala[Bradley.Twunjala@epa.gov]; Gillam, Rick[Gillam.Rick@epa.gov]; Howard, Chris[Howard.Chris@epa.gov]; Krivo, Stan[Krivo.Stanley@epa.gov]
Cc: Munsey, Elisabeth[Elisabeth.Munsey@dnr.ga.gov]; Tian, Di[Di.Tian@dnr.ga.gov]; Kim, Yunhee[Yunhee.Kim@dnr.ga.gov]; Hays, Karen[Karen.Hays@dnr.ga.gov]; Kuoh, Dika[Dika.Kuoh@dnr.ga.gov]
From: Boylan, James
Sent: Tue 8/30/2016 8:34:11 PM
Subject: International Paper-Savannah Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO2 NAAQS - UPDATE
GAEPD_IP-Savannah_SO2_Modeling_Update_Cover_Letter.pdf
GAEPD_IP-Savannah_SO2_Modeling_Summary_Update_Final.pdf

Dear Mr. Davis:

On June 30, 2016, the Georgia Environmental Protection Division (EPD) submitted a modeling demonstration to EPA to be used for SO2 designation recommendations. Specifically, this submittal included four items: (1) an initial modeling report submitted by AECOM, Inc. to EPD; (2) a final modeling report created by EPD; (3) a supporting EPD report titled "Analysis of 1 Hour SO2 NAAQS Exceedances in Savannah and Rome" (December 23, 2013); and (4) a copy of all modeling inputs/output files on a DVD. With this submittal, EPD is revising the modeling demonstration to include additional receptors along the fence line of the facility.

A total of two (2) attachments are included:

(1) a copy of the cover letter from Dr. James Boylan (EPD) to Mr. Scott Davis (EPA), and

(2) an updated final modeling report created by EPD.

A hard copy of these two documents along with a copy of all modeling inputs/output files on a DVD have been placed in the mail. Should you or your staff have any questions, please feel free to contact me at (404) 363-7014.

Sincerely,

Jim Boylan

James W. Boylan, Ph.D.

Manager, Planning & Support Program

Georgia Department of Natural Resources

Environmental Protection Division - Air Protection Branch

4244 International Parkway, Suite 120

Atlanta, GA 30354

Office: 404-363-7014   Fax: 404-363-7100

E-mail: James.Boylan@dnr.ga.gov

From: Boylan, James
Sent: Thursday, June 30, 2016 7:54 AM
To: 'davis.scottr@epa.gov'; benjamin.lynorae@epa.gov; 'rinck.todd@epa.gov'; Bradley, Twunjala (Bradley.Twunjala@epa.gov); Gillam, Rick (Gillam.Rick@epa.gov); 'Howard.Chris@epa.gov'; 'Krivo.Stanley@epa.gov'
Cc: Munsey, Elisabeth; Tian, Di; Kim, Yunhee; Hays, Karen; Kuoh, Dika
Subject: International Paper-Savannah Modeling for EPA's Data Requirements Rule for the 2010 1-Hour SO2 NAAQS

Dear Mr. Davis,

On June 8, 2016, the Georgia Environmental Protection Division (EPD) submitted a letter to EPA describing the approach that will be used to characterize air quality at sources in Georgia that had annual actual SO2 emissions exceeding 2,000 tons per year (tpy) in 2014. In that letter, EPD stated that International Paper-Savannah would be characterized with air quality modeling. Since 2011-2013 air quality modeling was previously conducted and submitted to EPA for International Paper-Savannah as part of the Sierra Club Consent Decree, EPD is submitting a revised modeling report and analysis in lieu of submitting a modeling protocol. This modeling report and analysis contains all the information required by a modeling protocol in addition to the modeling results. In addition, this report will demonstrate that modeling 2011-2013 is clearly a conservative estimate of the current SO2 impacts from IP-Savannah and can be used for designation recommendations.

A total of four (4) attachments are included:

(1) a copy of the cover letter from Ms. Karen Kays (EPD) to Mr. Scott Davis (EPA),

(2) a final modeling report created by EPD,

(3) a supporting EPD report titled "Analysis of 1 Hour SO2 NAAQS Exceedances in Savannah and Rome" (December 23, 2013), and

(4) an initial modeling report submitted by AECOM, Inc. to EPD.

A hard copy of these four documents along with a copy of all modeling inputs/output files on a DVD have been placed in the mail. Should you or your staff have any questions, please feel free to contact me at (404) 363-7014.

Sincerely,

Jim Boylan

James W. Boylan, Ph.D.

Manager, Planning & Support Program

Georgia Department of Natural Resources

Environmental Protection Division - Air Protection Branch

4244 International Parkway, Suite 120

Atlanta, GA 30354

Office: 404-363-7014   Fax: 404-363-7100

E-mail: James.Boylan@dnr.state.ga.us

International Paper-Savannah
Dispersion Modeling for the 2010 1-Hour SO_2 NAAQS - UPDATE
August 30, 2016

The Lathrop & Augusta SO_2 monitor (13-051-1002) located in Savannah, GA (Chatham County) had a 2012-2014 design value of 78 ppb which was above the NAAQS level of 75 ppb. Therefore, the area surrounding this monitor was initially identified for early designation through the Sierra Club Consent Decree (i.e., "Round 2" designations). In 2013, GA EPD performed air quality modeling and back trajectory analysis that clearly showed that International Paper-Savannah (IP-Savannah) was the only significant SO_2 source contributing to exceedances of the NAAQS. IP-Savannah is located less than 2 km away from the Lathrop & Augusta SO_2 monitor. The details of this analysis are contained in a document titled "Analysis of 1-Hour SO_2 NAAQS Exceedances in Savannah and Rome" (December 23, 2013).

In early 2015, Georgia EPD requested that IP-Savannah submit a detailed modeling analysis characterizing the Mill's emission sources and model impacts. IP-Savannah submitted a dispersion modeling report and related modeling files prepared by AECOM, Inc. Georgia EPD reviewed the modeling report and files to ensure that the dispersion modeling has been conducted in accordance with the final Data Requirements Rule (DRR) and Modeling Technical Assistance Document (TAD) using the most recently available information (which was 2011-2013 emissions at the time the modeling was performed). Based on this review, Georgia EPD made some adjustments to the modeling files that were submitted to insure the most reliable results were used in the analysis.

In February 2016, Georgia EPD certified the 2015 SO_2 data at the Lathrop & Augusta SO_2 monitor and the resulting 2013 -2015 design value was 70 ppb which was below the NAAQS level of 75 ppb. Therefore, the area surrounding the Lathrop & Augusta SO_2 monitor was removed from the Sierra Club Consent Decree "Round 2" designations and IP-Savannah was added to the "Round 3" designations since their 2014 SO_2 emissions were over 2,000 tons/year.

This report discusses the procedures used to review the supporting dispersion modeling and the modeling results are summarized.

Meteorological Data

Meteorological data was created for the monitoring site using AERMETv 15181 for the period 2011-2013. The Lathrop & Augusta monitoring location contains on-site meteorological measurements for wind speed and wind direction. The other required surface meteorological fields were extracted from the Savannah International Airport ASOS site (SAV) and the upper air measurements were extracted from the Charleston, SC station (CHS). The data were compiled and provided to IP-Savannah by GA EPD. The AERMET processor was used to convert the NWS data into AERMOD model-ready meteorological data files using the AERSURFACE surface characteristics evaluation utility (13016).

Values of the surface characteristics (albedo, Bowen ratio, and surface roughness) surrounding the monitor site and the project site were derived for each of twelve 30-degree sectors over four seasons, in accordance with the AERMOD Implementation Guide (09078). GA EPD compared the above AERSURFACE generated surface characteristics, and found no significant differences in the albedo and

Bowen ratio for the two sites. However, significant differences in the surface roughness were observed. To evaluate the impacts of the surface characteristics on modeling results, AERMOD was run twice - once with surface characteristics based on the Lathrop & Augusta SO_2 monitor site and again with surface characteristics based on the IP-Savannah facility site. The modeling results showed that the projected SO_2 concentrations using the surface characteristics based on the IP-Savannah facility site were significantly higher (and hence more conservative) than those using the surface characteristics based on the Lathrop & Augusta SO_2 monitor site. Also, the model performance at the receptor containing the SO_2 monitor was significantly better using the surface characteristics based on the IP-Savannah facility site. Therefore, a meteorological dataset with the IP-Savannah facility site surface characteristics was used in the primary modeling demonstration. For more details on this comparison, please see Appendix A.

This model was also used to evaluate surrounding land use within 3 kilometers. Based on the output from the AERSURFACE, approximately 40% of surrounding land use around the modeled facility was of urban land use types including Type 21 (Low Intensity Residential), Type 22 (High Intensity Residential), and Type 23 (Commercial/Industrial/Transportation). This is less than the 50% value considered appropriate for the use of urban dispersion coefficients. Based on the AERSURFACE analysis, it was concluded that the rural option would be used for the modeling summarized in this report.

Source Data

IP-Savannah has four significant SO_2 sources including No. 13 Power Boiler which is the Mill's largest source of SO_2 emissions and six intermittently operated SO_2 sources. Although the six stationary internal combustion engines at the Mill operate intermittently and fire ultra-low sulfur diesel fuel, they were included in the modeling at full operation in order to fully examine the Mill's impact on ambient SO_2 concentrations at the fence line and beyond. Stack exit temperature and stack exit flow data from similar engines at another International Paper mill were used. Five of the intermittent engines have horizontal stacks and were modeled using a default stack exit velocity of 0.001 m/s according to guidance from AERMOD Implementation Guide. Hourly actual emission rates, temperature, stack exit velocity, and flow rates were calculated for the four primary SO_2 sources at IP-Savannah for the same time period as the meteorological data (2011 -2013). The calculated emissions and flow rates were compared to the values measured by CEMS units on each of the sources.

Off-Site Inventory

A detailed analysis of all point sources within 50 km of the Lathrop & Augusta SO_2 monitor in Savannah is contained in the attached document titled "Analysis of 1-Hour SO2 NAAQS Exceedances in Savannah and Rome" (December 23, 2013). This analysis included identification of nearby SO_2 sources and Q/d (emissions/distance) analysis; back trajectory analysis on SO_2 exceedance days, and AERMOD modeling to quantify source-by-source contributions to SO_2 exceedances for all sources with a Q/d over 20. Based on this analysis, it was concluded that the SO_2 emissions from IP-Savannah was the primary cause of SO_2 NAAQS exceedances at the Lathrop & Augusta SO_2 monitor. All other sources of SO_2 emissions were deemed to be insignificant. Therefore, no offsite sources will be explicitly modeled and the impact from those sources will be captured in the seasonal diurnally varying background concentration.

Receptor Locations

A Cartesian receptor grid extending to approximately 10 km from IP-Savannah was used in the modeling analysis to assess ground-level SO_2 concentrations. The discrete receptors were placed according to the following configuration based on the center of the plant:

- At property boundary ➔ 50 meters apart
- Property boundary – 4 km ➔ 100 meters apart
- 4 km – 10 km ➔ 500 meters apart

This domain is sufficient to capture the maximum impact. Receptors were removed over bodies of water and other areas where a monitor could not be placed. Finally, an additional receptor was added at the location of the SO_2 monitor. Figure 1 shows the modeling receptor grid and receptors. All receptor locations are represented in the Universal Transverse Mercator projections, Zone 17, North American Datum 1983.

Figure 1. Modeling receptor grid with monitor location marked by the green circle.

Terrain Elevation

Terrain data from USGS 1/3 arc-second/10-meter resolution National Elevation Dataset (NED) CONUS were extracted to obtain the elevations of all sources, buildings, and receptors by AERMAP terrain processor (version 11103). The resulting elevation data were verified by comparing contoured receptor elevations with USGS 7.5-minute topographic map contours.

Building Downwash

The effects of building downwash were incorporated into the AERMOD analysis. Direction -specific building parameters required by AERMOD were developed using the BPIP PRIME utility (version 04274). The GEP (Good Engineering Practice) an alysis was performed for the IP -Savannah Mill to demonstrate compliance with stack height regulations (40 CFR Part 51) and to determine which emission sourc es are impacted by building wake and downwash effects. The building heights and projected widths were input into the model for each ten degrees of wind direction. These building heights and projected widths are the same as those used for the GEP stack height calculation.

Background

The seasonal hour of day background SO_2 concentrations were developed by GA EPD. This background value is meant to include impacts from other sources surrounding the monitor. The seasonal hour of day background concentration was calculated for each of the four seasons using the following steps:

1. For each year (2011-2013), SO_2 data was sorted by wind direction.
2. All SO_2 values corresponding to a wind direction between 0° and 45° were ignored.
3. For each year, the remaining SO_2 data was sorted by season; spring (March -May), summer (June-August), fall (September- November), and winter (December-February).
4. For each season, SO_2 data was sorted by hour of day.
5. For each year and season, the second highest SO_2 value was selected for each hour of the day.
6. The average over the three years of the second highest SO_2 value was calculated for each hour of the day for each season.

Table 1 and Figure 2 show the seasonal hour of day SO_2 background concentrations used in the model.

Table 1. Seasonal hour of day background SO_2 concentration for 2011-2013 at 13-051-1002.

Hour of Day	Spring	Summer	Fall	Winter
0:00	7.1	4.2	4.5	12.2
1:00	6.2	4.7	4.8	9.2
2:00	5.6	3.5	4.9	18.2
3:00	3.9	3.5	6.7	8.2
4:00	6.0	4.4	6.9	10.5
5:00	6.5	4.6	7.2	10.9
6:00	6.8	8.2	6.4	8.4
7:00	8.6	12.4	5.9	9.1
8:00	16.5	9.1	15.3	10.4
9:00	14.8	19.0	25.8	21.2
10:00	12.4	15.1	19.4	19.7
11:00	15.8	14.4	18.3	20.3
12:00	10.2	11.1	13.4	16.9
13:00	15.1	7.4	14.2	17.4
14:00	9.5	14.4	17.1	12.2
15:00	8.5	4.9	11.6	9.4
16:00	6.2	6.6	12.0	8.6
17:00	6.3	9.4	9.3	8.0
18:00	6.5	4.6	10.4	12.0
19:00	7.1	5.8	9.3	8.7
20:00	6.8	7.6	6.9	10.3
21:00	7.2	6.2	8.3	9.0
22:00	7.8	5.4	5.1	7.6
23:00	4.8	6.6	6.3	10.1

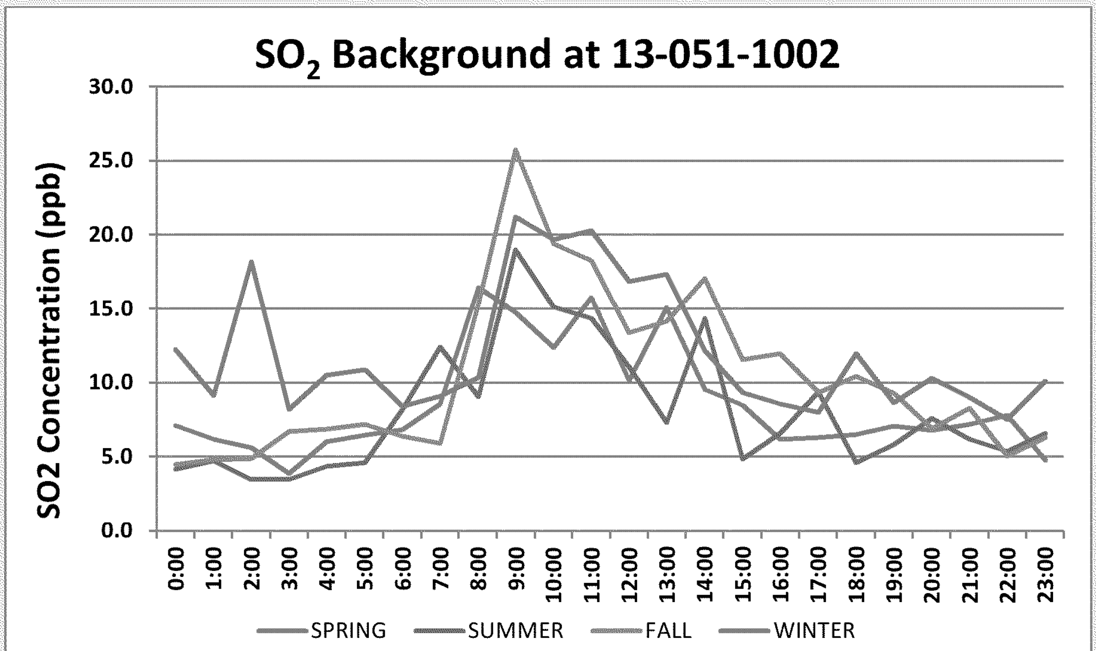

Figure 2. Seasonal hour of day SO_2 background concentration for 2011-2013 at 13-051-1002.

1-Hour SO_2 NAAQS Assessment

As part of the 1-hour SO_2 NAAQS analysis, ambient background was added to modeled concentrations to assess compliance with the 1-hour SO_2 NAAQS. The highest four modeled values at the monitor for each year are shown in Table 2. The modeled design value concentration was calculated by AERMOD (version 15181) using actual hourly emissions including the seasonal hour of day background values from 2011-2013 and reflects the three-year average of the 99th percentile ranked daily maximum 1-hour SO_2 concentration. Modeled concentrations at the monitor were typically less than the monitored values (Table 3). The highest 99th percentile modeled concentration in the modeling domain was 66 ppb, which is below the NAAQS of 75 ppb. The fourhighest modeled values in the modeling domain are presented in Table 4 and the location of the fourhighest modeled concentrations are shown in Figure 3. As seen in Figure 4, the 4th highest modeled maximum 1 -hour concentration averaged over 3 -years for SO_2 was located at approximately 1.97 kilometers south of IP-Savannah Mill.

Table 2. Ranked modeled SO_2 concentrations at the monitor for 2011-2013.

Rank	2011 (ppb)	2012 (ppb)	2013 (ppb)	3-year Average (ppb)
1st High	74	114	64	84
2nd High	68	54	58	60
3rd High	66	51	57	58
4th High	65	50	53	**56**

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Table 3. Ranked monitored SO_2 concentrations for 2011-2013.

Rank	2011 (ppb)	2012 (ppb)	2013 (ppb)	3-year Average (ppb)
1st High	95	128	142	122
2nd High	94	112	118	108
3rd High	76	87	101	88
4th High	72	74	93	**79**

Table 4. Ranked modeled SO_2 concentrations at the location of maximum concentration for 2011-2013.

Rank	2011 (ppb)	2012 (ppb)	2013 (ppb)	3-year Average (ppb)	Receptor (lat,log)	Distance from IP Savannah Mill (Km)
1st High	104	139	62	101	32.0925, -81.1335	1.55
2nd High	68	82	84	78	32.0943, -81.1378	1.67
3rd High	66	62	74	67	32.0844, -81.1229	2.26
4th High	65	61	73	**66**	32.0862, -81.1229	1.97

Comparisons of the daily maximum monitored and modeled concentrations at the monitor and in the entire model domain are shown in Figure 5 - Figure 11 for the years 2011-2013. There is a minimum modeled concentration for each season due to the background value even if the model is predicting no concentration from IP-Savannah at the monitor. The quantile-quantile (Q-Q) plot in Figure 11 shows the comparison of the daily maximum measured SO_2 values at the monitor versus the daily maximum modeled concentration at the monitor. The model does not predict values at the monitor as high as the measured values. The quantile-quantile (Q-Q) plot in Figure 12 shows the comparison of the daily maximum measured SO_2 values at the monitor versus the daily maximum modeled concentration in the domain. The model predicts values in the domain that are higher than the measured values.

Figure 3. Google Earth map for ranked modeled concentrations at the location of maximum impact.

Figure 4. Concentration isopleth of the 4th highest daily maximum 1-hour SO_2 averaged over 3 years.

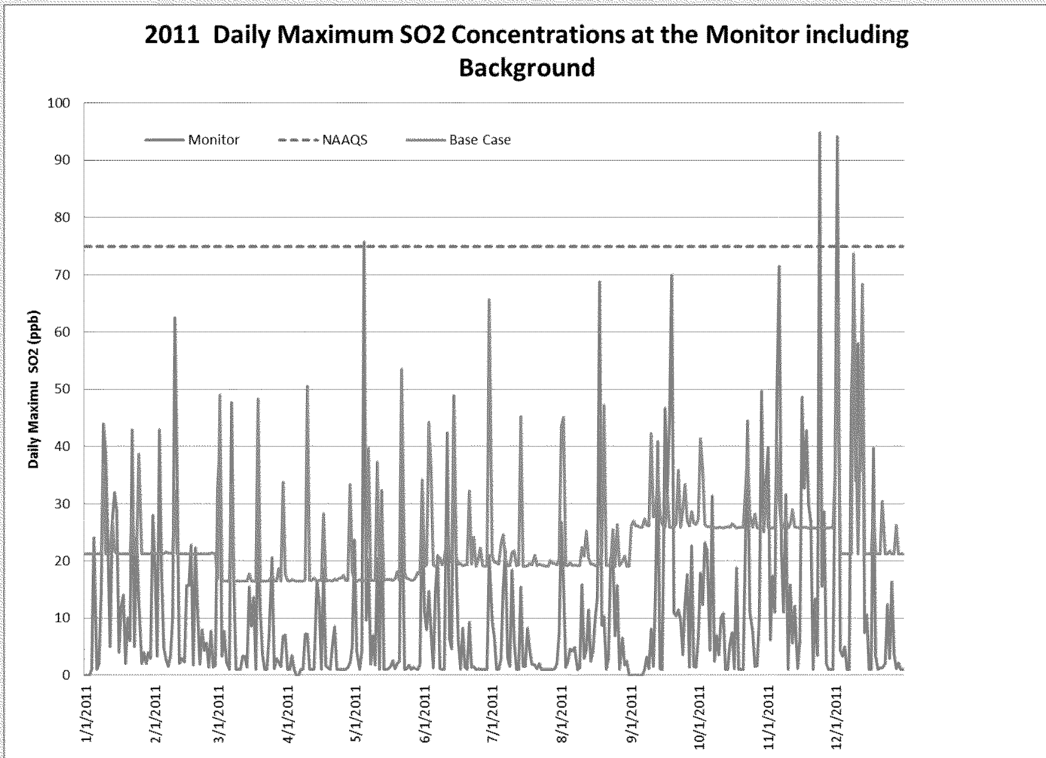

Figure 5. Comparison of 2011 daily maximum monitored and modeled concentrations at the monitor.

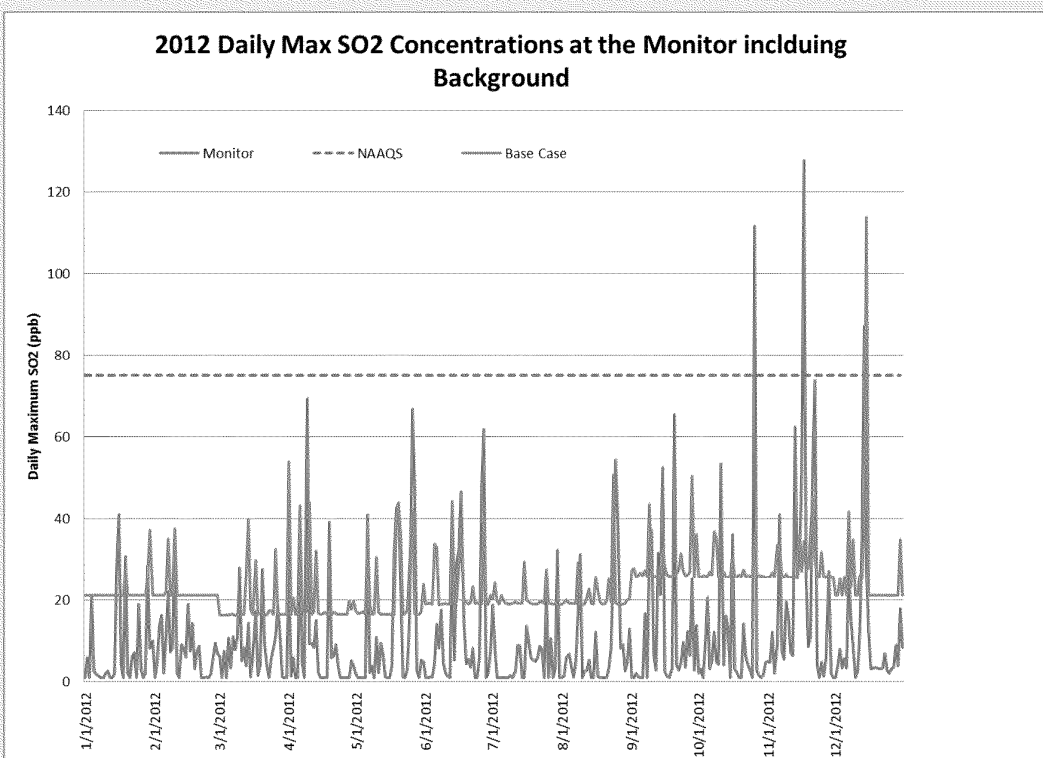

Figure 6. Comparison of 2012 daily maximum monitored and modeled concentrations at the monitor.

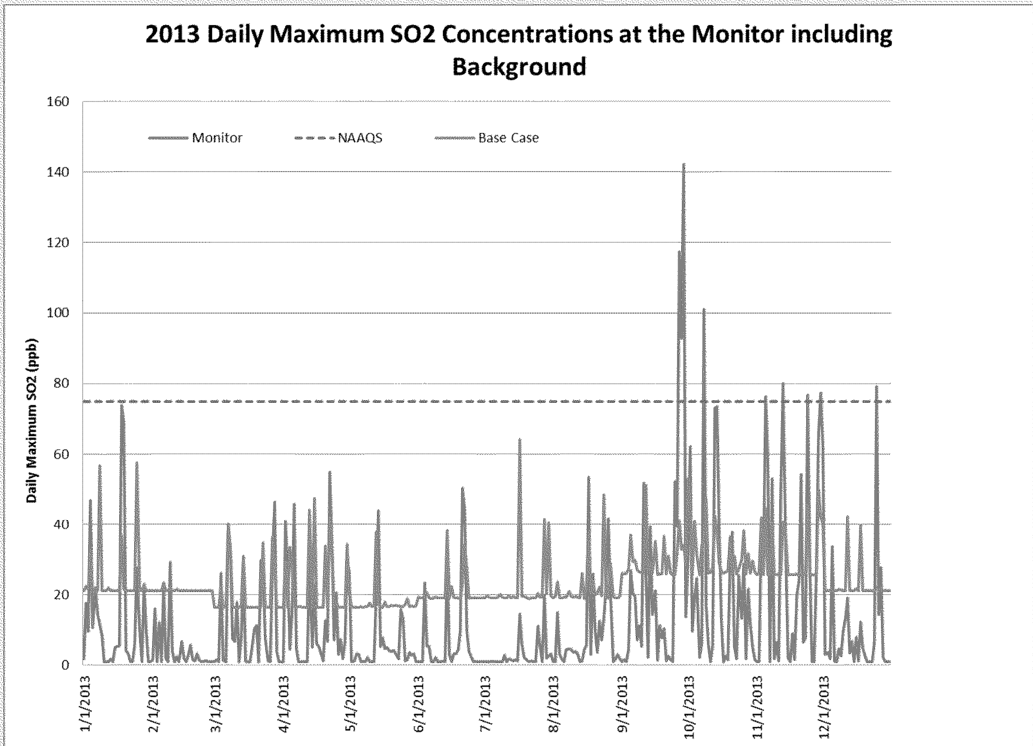

Figure 7. Comparison of 2013 daily maximum monitored and modeled concentrations at the monitor.

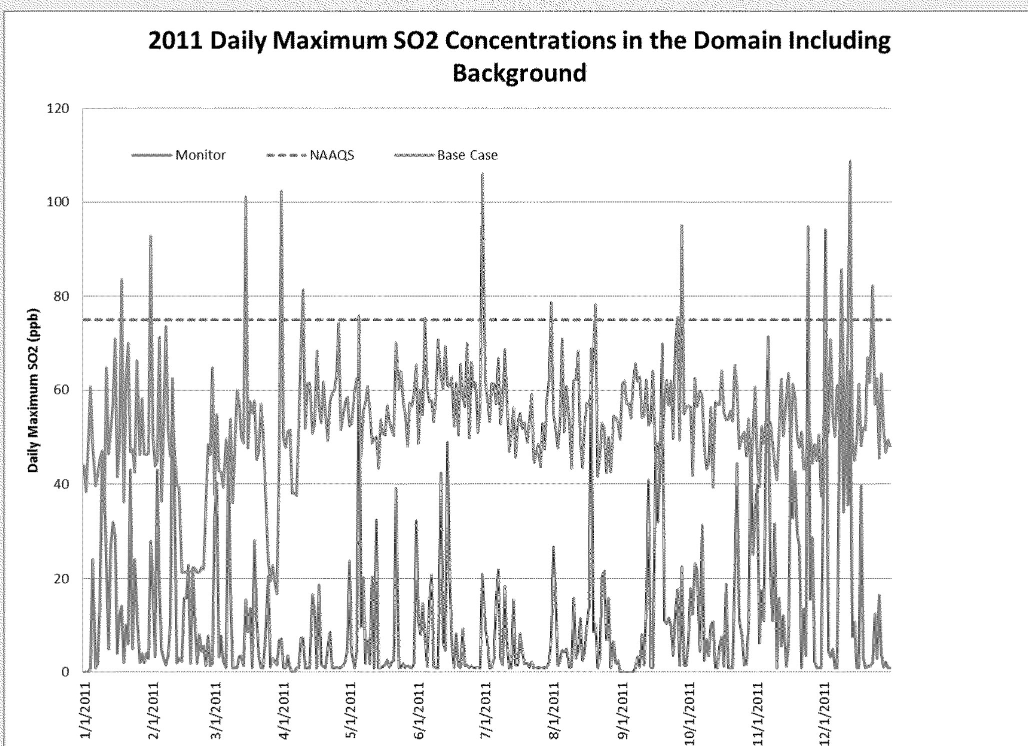

Figure 8. Comparison of 2011 daily maximum monitored and modeled concentrations in the domain.

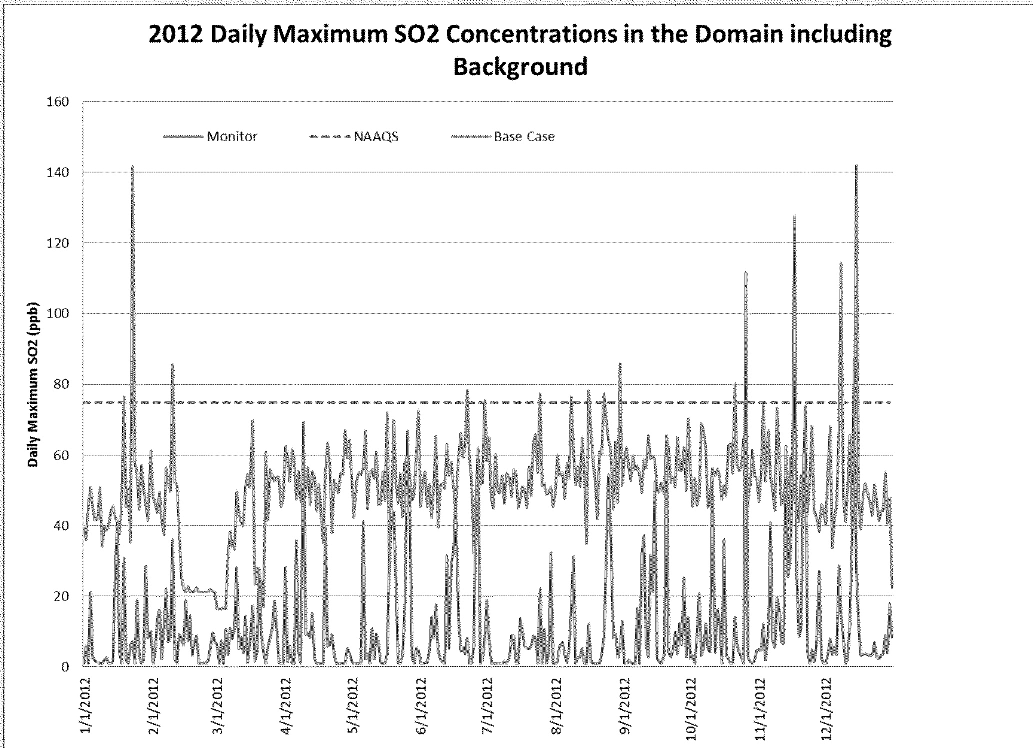

Figure 9. Comparison of 2012 daily maximum monitored and modeled concentrations in the domain.

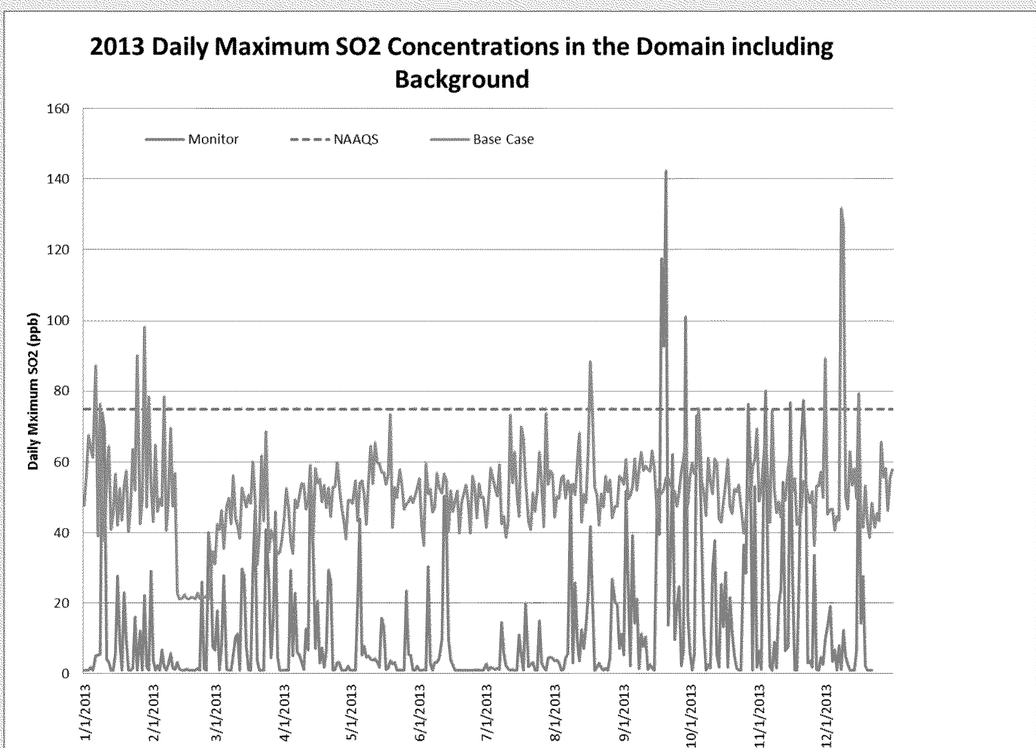

Figure 10. Comparison of 2013 daily maximum monitored and modeled concentrations in the domain.

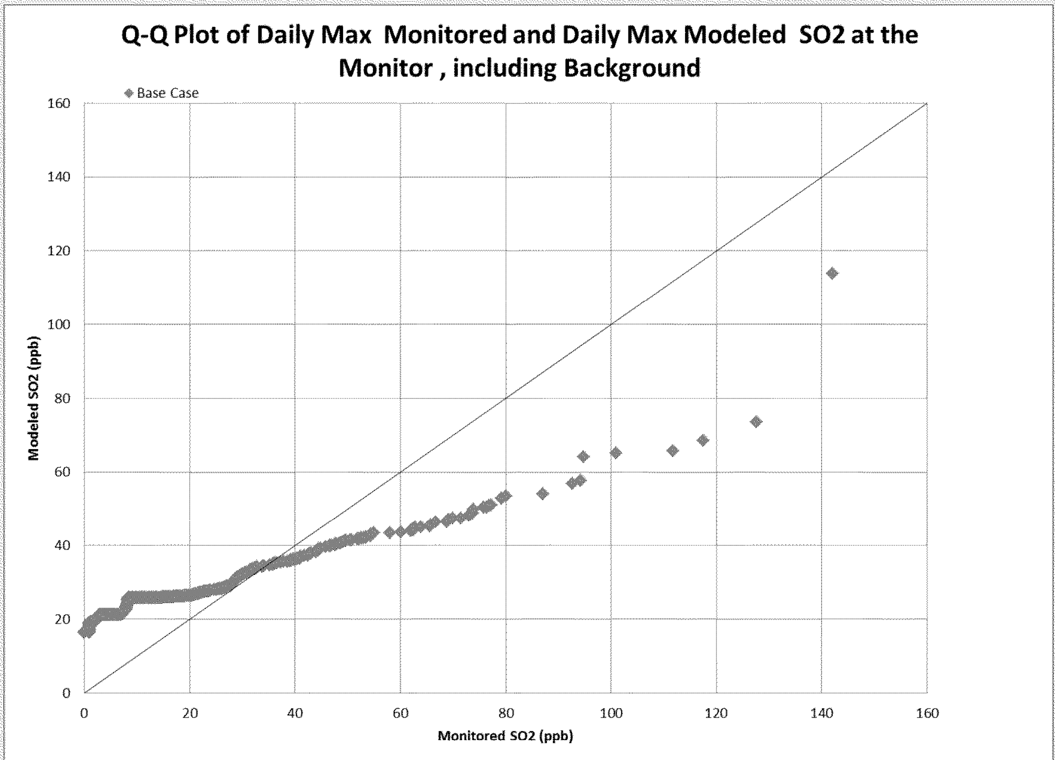

Figure 11. Daily maximum 1-hour SO_2 monitored vs. modeled values at the monitor.

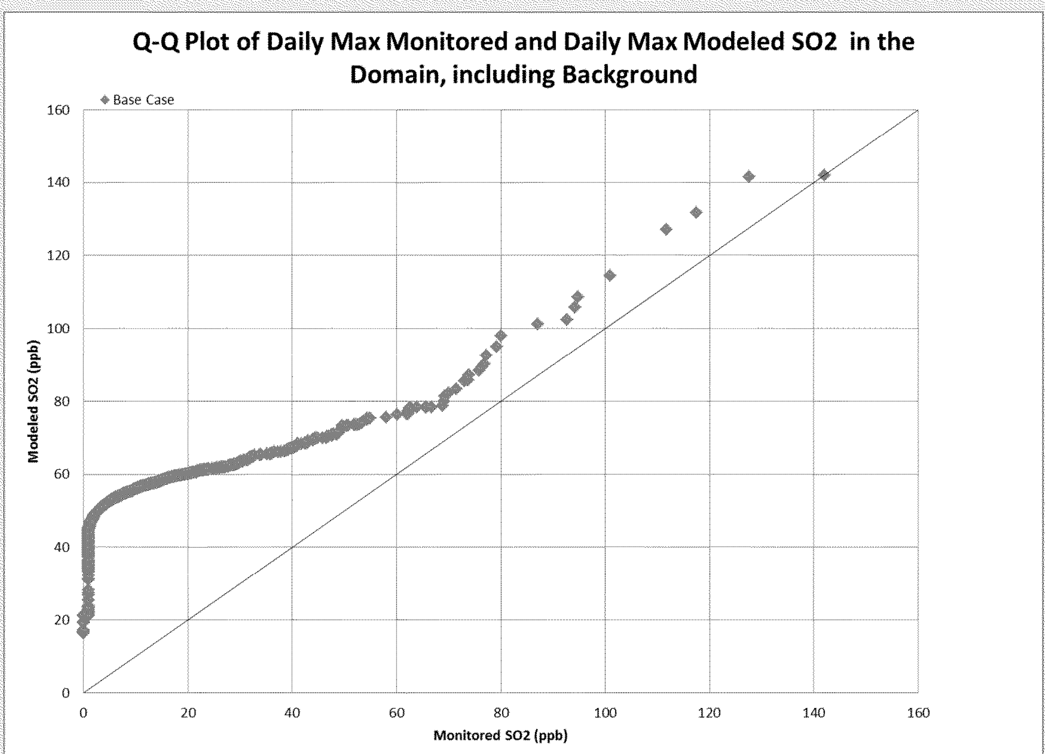

Figure 12. Daily maximum 1-hour SO_2 monitored vs. modeled values in the entire domain.

Ambient Monitoring Siting Assessment for 1-hour SO_2 NAAQS

Design values (DVs) were calculated by modeling with actual hourly SO_2 emissions (2011-2013) for IP-Savannah. The DVs are the 3-year average of each year's 4th highest daily 1-hour maximum SO_2 concentration, which is equivalent to the 99th percentile of daily 1-hour maximum concentrations. DVs provide a means to understanding the magnitude of ambient SO_2 concentrations across an area. Figure 13 shows the DVs for each modeled receptor. The red colors indicate higher DVs. The receptors with the top five (5) highest overall DVs are circled with mark 'X' in black, and are directly south of IP-Savannah. An additional analysis was performed to identify the receptors having the top 200, 100, 25, and 10 DVs. The results are shown in Figure 14.

In order to assess the frequency of occurrence of maximum concentration at a given receptor, an analysis was performed in AERMOD where the MAXDAILY option was used to output the maximum 1-hour concentration for each receptor for each day. This output was used to determine the number of days for which each receptor (with a minimum value of 60 ppb) was the overall highest 1-hour concentration over the 3 years that were modeled. A minimum threshold value of 60 ppb was applied since modeled values that are more than 20% below the NAAQS level should not be considered when trying to site a monitor for maximum impacts relative to the NAAQS. The results are shown in Figure 15 and the receptor with the overall highest number of days (7 days) is circled with mark 'X' in black. The receptor with the highest frequency of having the daily 1-hour maximum concentrations is directly south of the IP-Savannah, but does not have a DV within the top 200.

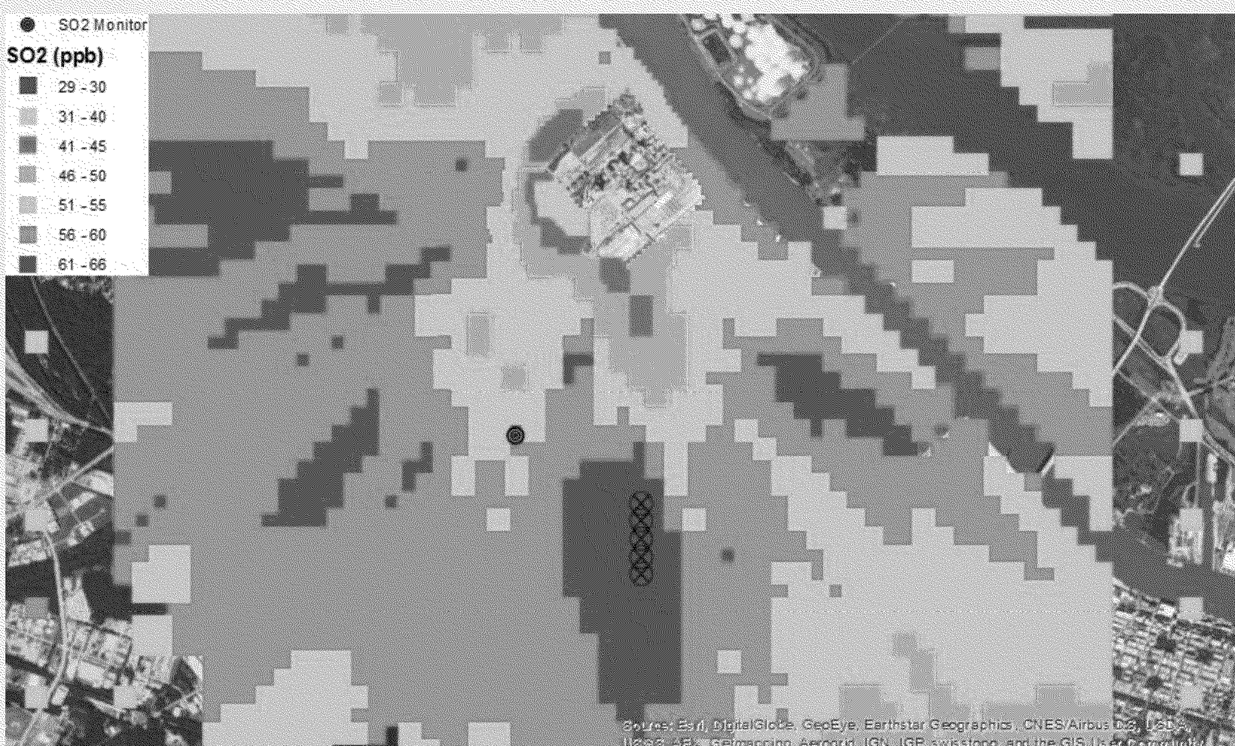

Figure 13. Design values near IP-Savannah. The top five (5) highest overall DVs are circled with mark 'X' in black.

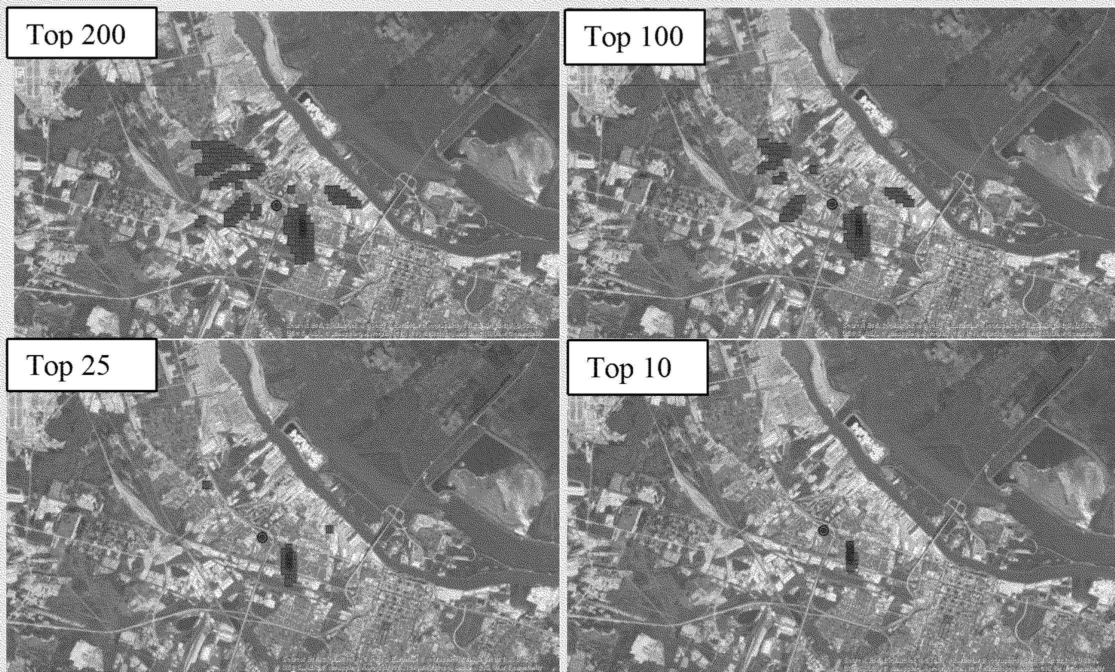

Figure 14. Locations of Top 200, 100, 25, and 10 normalized design values . The top five (5) highest overall DVs are circled with mark 'X' in black.

Figure15. Cumulative number of days that an individual receptor had the 1 -hour daily maximum concentration among all receptors with a minimum threshold value of 60 ppb.

Figure 16 shows a relative prioritized place ment of monitor locations for consideration using DVs and frequency of having the 1-hour daily maximum concentration (with a threshold value of 60 ppb). The scores are calculated by the sum of the rank of DVs and the rank of the number of days that the receptor had the 1-hour daily maximum concentration (with a threshold value of 60 ppb). Lower numerical scores indicate a higher probability of experiencing peak 1-hour SO_2 concentrations. The top five receptor locations are circled with mark 'X' in black and are directly south of IP-Savannah.

Although the current SO_2 monitor location is not exactly at the location with the lowest score, it is very close (less than 1 km). AERMOD is not designed to simulate the exact location of the maximum impact, but rather gives a distribution of probabilistic locations. Since there are no significant variations in the topography in the red arc , GA EPD feels that locating a SO_2 monitor anywhere within the red arc in Figure 16 would satisfy the requirement for measuring the maximum SO_2 impact. Since the current location of the Lathrop & Augusta SO_2 monitor (13-051-1002) falls within the red arc and is less than 1 km from the four receptors with the lowest scores, GA EPD feels that this monitor is properly sited to measure maximum impacts and can be used for future attainment demonstrations.

Figure 16. Scores reflecting DVs and frequency of having the 1-hour daily maximum in the domain . The red arc indicates locations where a SO_2 monitor could be placed to monitor maximum SO_2 impacts.

Conclusions

The International Paper-Savannah dispersion modeling for the 2010 1 -hour SO_2 NAAQS designations has been conducted in accordance with the final Data Requirements Rule (DRR) and Modeling Technical Assistance Document (TAD) using the most recently available information (which was 2011-2013 emissions at the time the modeling was performed). Based on the final modeling analysis, SO_2 emissions from IP-Savannah do not cause any violations of the 1-hour SO_2 NAAQS. Also, Georgia EPD has demonstrated that the current location of the Lathrop & Augusta SO_2 monitor (13-051-1002) is representative of maximum SO_2 impacts and can be used for future attainment demonstrations.

Appendix A
Surface Characteristics Comparison

Meteorological data was created for the Lathrop & Augusta SO_2 monitoring site using AERMETv15181 for the period 2011 -2013. The Lathrop & Augusta SO_2 monitoring location contains on-site meteorological measurements for wind speed and wind direction. The other required surface meteorological fields were extracted from the Savannah International Airport ASOS site (SAV) and the upper air measurements were extracted from the Charleston, SC station (CHS).

AERMOD modeling for the Lathrop & Augusta SO_2 monitoring site was performed with two sets of surface characteristics (albedo, Bowen ratio, and surface roughness). Primary and secondary surface characteristics are required in AERMET when both ONSITE and SURFACE data are provided. One set of AERMOD data established both the primary and secondary surface characteristics based on the Lathrop & Augusta SO_2 monitor site. The second set of AERMOD data established the primary surface characteristics based on the International Paper facility site and the secondary surface characteristics based on the Lathrop & Augusta SO_2 monitor site. Both sets used AERSURFACE (13016) derived for twelve 30-degree sectors out to 1 km at a seasonal temporal resolution for average surface moisture conditions. A comparison of the primary surface characteristics between the SO_2 monitor site and the facility site is shown in Table A-1. No significant differences in the albedo and Bowen ratio were found. However, significant differences in the surface roughness were observed.

Figure A-1 contains the 4^{th} highest modeled maximum 1 -hour SO_2 concentration averaged over three years using the surface characteristics at the Lathrop & Augusta SO_2 monitor site. The maximum value was located at approximately 0.87 kilometers west of the International Paper facility. Figure A-2 contains the 4^{th} highest modeled maximum 1-hour SO_2 concentration averaged over three years using the surface characteristics at the International Paper facility site. The maximum value was located at approximately 1.97 kilometers south of the International Paper facility.

Figure A-3 contains the ranked modeled concentrations with surface characteristics from the Lathrop & Augusta SO_2 monitor site at the locations of maximum impact. Figure A-4 contains the ranked modeled concentrations with surface characteristics from the International Paper facility site at the locations of maximum impact. Figure A-5 shows a three year wind rose at the Lathrop & Augusta monitor site for 2011-2013.

Table A-1. Comparisons of albedo, Bowen ratio, and surface roughness at the Lathrop & Augusta SO_2 monitor site and the International Paper facility site.

Lathrop & Augusta Monitor			**International Paper Facility**						
Albedo	Bowen Ratio	Surface Roughness	Albedo	Bowen Ratio	Surface Roughness	Δ Surface Roughness	Δ% Surface Roughness	Time Frequency	Wind Sector
0.16	0.62	0.292	0.14	0.45	0.076	0.22	284	Winter	1 of 12
0.16	0.62	0.454	0.14	0.45	0.032	0.42	1319	Winter	2 of 12
0.16	0.62	0.526	0.14	0.45	0.095	0.43	454	Winter	3 of 12
0.16	0.62	0.659	0.14	0.45	0.082	0.58	704	Winter	4 of 12
0.16	0.62	0.663	0.14	0.45	0.090	0.57	637	Winter	5 of 12
0.16	0.62	0.310	0.14	0.45	0.049	0.26	533	Winter	6 of 12
0.16	0.62	0.177	0.14	0.45	0.046	0.13	285	Winter	7 of 12
0.16	0.62	0.349	0.14	0.45	0.138	0.21	153	Winter	8 of 12
0.16	0.62	0.562	0.14	0.45	0.143	0.42	293	Winter	9 of 12
0.16	0.62	0.474	0.14	0.45	0.132	0.34	259	Winter	10 of 12
0.16	0.62	0.180	0.14	0.45	0.115	0.07	57	Winter	11 of 12
0.16	0.62	0.158	0.14	0.45	0.101	0.06	56	Winter	12 of 12
0.15	0.56	0.322	0.14	0.38	0.092	0.23	250	Spring	1 of 12
0.15	0.56	0.481	0.14	0.38	0.039	0.44	1133	Spring	2 of 12
0.15	0.56	0.571	0.14	0.38	0.113	0.46	405	Spring	3 of 12
0.15	0.56	0.706	0.14	0.38	0.101	0.61	599	Spring	4 of 12
0.15	0.56	0.711	0.14	0.38	0.113	0.60	529	Spring	5 of 12
0.15	0.56	0.361	0.14	0.38	0.063	0.30	473	Spring	6 of 12
0.15	0.56	0.209	0.14	0.38	0.061	0.15	243	Spring	7 of 12
0.15	0.56	0.389	0.14	0.38	0.167	0.22	133	Spring	8 of 12
0.15	0.56	0.605	0.14	0.38	0.174	0.43	248	Spring	9 of 12
0.15	0.56	0.530	0.14	0.38	0.158	0.37	235	Spring	10 of 12
0.15	0.56	0.213	0.14	0.38	0.135	0.08	58	Spring	11 of 12
0.15	0.56	0.188	0.14	0.38	0.118	0.07	59	Spring	12 of 12
0.16	0.51	0.345	0.14	0.30	0.105	0.24	229	Summer	1 of 12
0.16	0.51	0.504	0.14	0.30	0.045	0.46	1020	Summer	2 of 12
0.16	0.51	0.584	0.14	0.30	0.128	0.46	356	Summer	3 of 12
0.16	0.51	0.754	0.14	0.30	0.116	0.64	550	Summer	4 of 12
0.16	0.51	0.732	0.14	0.30	0.130	0.60	463	Summer	5 of 12
0.16	0.51	0.427	0.14	0.30	0.077	0.35	455	Summer	6 of 12
0.16	0.51	0.311	0.14	0.30	0.075	0.24	315	Summer	7 of 12
0.16	0.51	0.426	0.14	0.30	0.210	0.22	103	Summer	8 of 12
0.16	0.51	0.635	0.14	0.30	0.201	0.43	216	Summer	9 of 12
0.16	0.51	0.575	0.14	0.30	0.179	0.40	221	Summer	10 of 12
0.16	0.51	0.303	0.14	0.30	0.152	0.15	99	Summer	11 of 12
0.16	0.51	0.215	0.14	0.30	0.131	0.08	64	Summer	12 of 12
0.16	0.62	0.331	0.14	0.45	0.092	0.24	260	Fall	1 of 12
0.16	0.62	0.499	0.14	0.45	0.040	0.46	1148	Fall	2 of 12
0.16	0.62	0.575	0.14	0.45	0.113	0.46	409	Fall	3 of 12
0.16	0.62	0.754	0.14	0.45	0.101	0.65	647	Fall	4 of 12
0.16	0.62	0.729	0.14	0.45	0.114	0.62	539	Fall	5 of 12
0.16	0.62	0.415	0.14	0.45	0.065	0.35	538	Fall	6 of 12
0.16	0.62	0.299	0.14	0.45	0.063	0.24	375	Fall	7 of 12
0.16	0.62	0.417	0.14	0.45	0.190	0.23	119	Fall	8 of 12
0.16	0.62	0.632	0.14	0.45	0.181	0.45	249	Fall	9 of 12
0.16	0.62	0.571	0.14	0.45	0.163	0.41	250	Fall	10 of 12
0.16	0.62	0.289	0.14	0.45	0.135	0.15	114	Fall	11 of 12
0.16	0.62	0.196	0.14	0.45	0.118	0.08	66	Fall	12 of 12

Figure A-1. Concentration isopleth of the 4th highest daily maximum 1-hour SO_2 averaged over 3 years with surface characteristics from the Lathrop & Augusta SO_2 monitor site.

Figure A-2. Concentration isopleth of the 4th highest daily maximum 1-hour SO_2 averaged over 3 years with surface characteristics from the International Paper facility site.

Figure A-3. Ranked modeled concentrations at the location of maximum impact with surface characteristics from the Lathrop & Augusta SO_2 monitor site.

Figure A-4. Ranked modeled concentrations at the location of maximum impact with surface characteristics from the International Paper facility site.

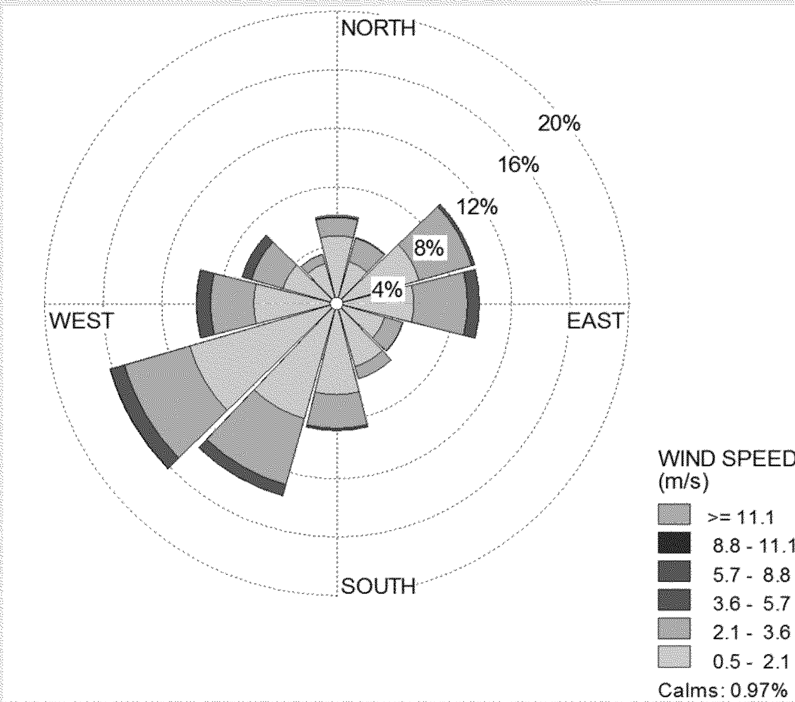

Figure A-5. Three year wind rose at the Lathrop & Augusta SO_2 monitor site for 2011-2013.

Figure A-6 contains a quantile-quantile plot comparing the modeled daily maximum SO_2 concentration at the receptor representing the location of the Lathrop & Augusta SO_2 monitor using (a) surface characteristics from the facility site and (b) surface characteristics from the SO_2 monitor site versus the daily maximum measured SO_2 concentration at the SO_2 monitor. Figure A-7 contains a quantile-quantile plot comparing the modeled daily maximum SO_2 concentration in the entire modeling domain using (a) surface characteristics from the facility site and (b) surface characteristics from the SO_2 monitor site versus the daily maximum measured SO_2 concentration at the SO_2 monitor. These plots clearly demonstrate that the model performs better with surface characteristics from the facility site (blue diamonds) versus surface characteristics from the SO_2 monitor site (green triangle).

The highest four modeled SO_2 values in the modeling domain for 2011, 2012, and 2013 using the surface characteristics from the Lathrop & Augusta SO_2 monitor site are presented in Table A-2. The highest four modeled SO_2 values in the modeling domain for 2011, 2012, and 2013 using the surface characteristics from the International Paper facility site are presented in Table A-3.

The AERMOD modeling results from both model runs indicate that SO_2 emissions from International Paper do not cause or contribute to any violations of the 1-hour SO_2 NAAQS. Also, the modeling results showed that the projected SO_2 concentrations using the surface characteristics based on the IP-Savannah facility site were significantly higher (and hence more conservative) than those using the surface characteristics based on the Lathrop & Augusta SO_2 monitor site. In addition, the model performance at the receptor containing the SO_2 monitor was significantly better using the surface characteristics based on the IP-Savannah facility site. Therefore, a meteorological dataset with the IP-Savannah facility site surface characteristics was used in the primary modeling demonstration.

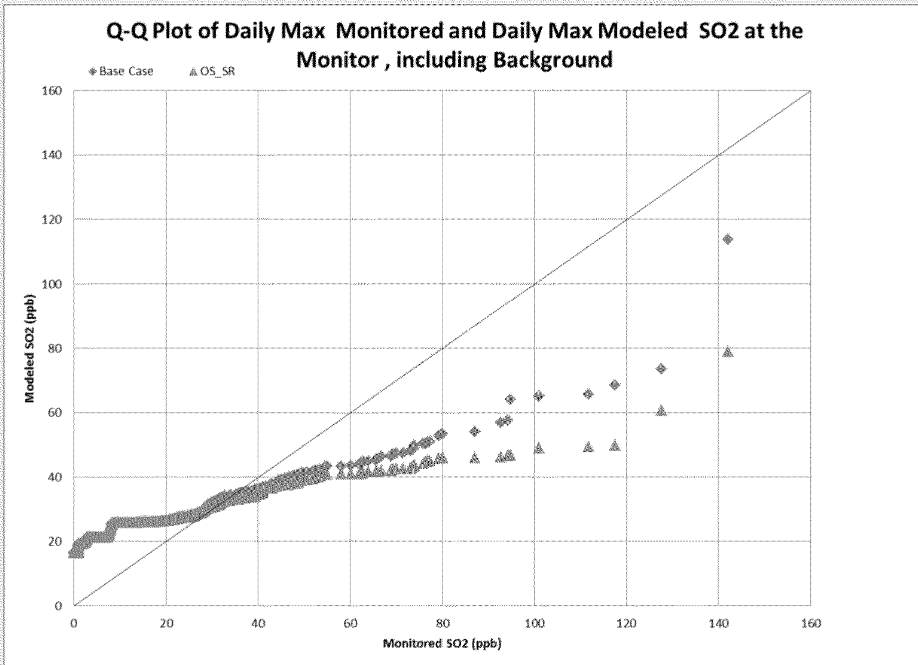

Figure A-6. Daily maximum 1-hour SO_2 monitored vs. modeled values at the SO_2 monitor location: (a) surface characteristics from the International Paper facility site (blue diamonds) and (b) surface characteristics from the Lathrop & Augusta SO_2 monitor site (green triangle).

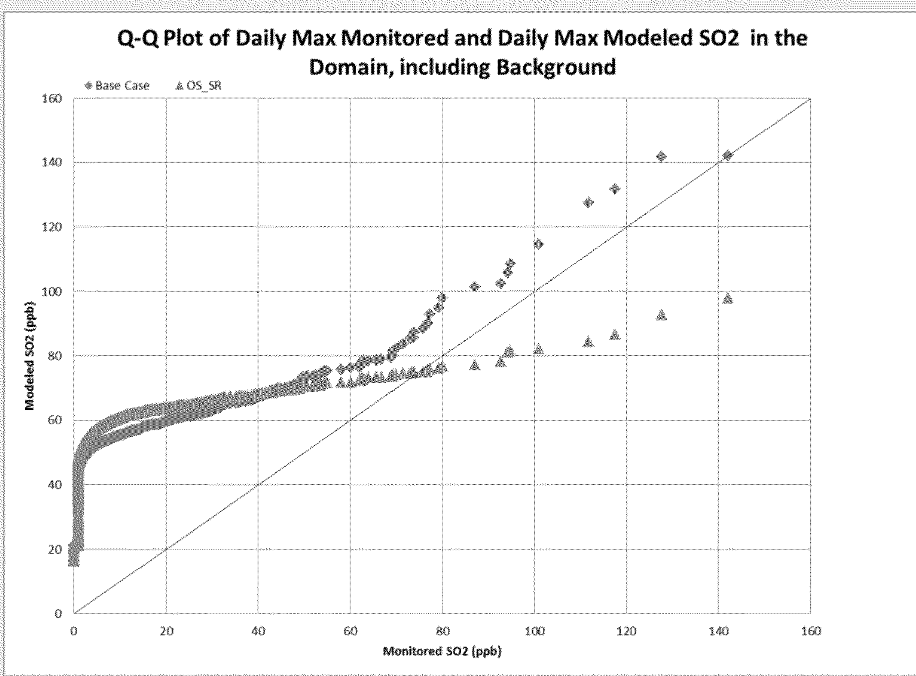

Figure A-7. Daily maximum 1-hour SO_2 monitored vs. modeled values in the entire domain (a) surface characteristics from the International Paper facility site (blue diamonds) and (b) surface characteristics from the Lathrop & Augusta SO_2 monitor site (green triangle).

Table A-2. Ranked modeled SO_2 concentrations at the location of maximum concentration for 2011-2013 with surface characteristics from the Lathrop & Augusta SO_2 monitor site.

Rank	2011 (ppb)	2012 (ppb)	2013 (ppb)	3-year Average (ppb)	Receptor (lat,log)	Distance from IP Savannah Mill (Km)
1st High	70	73	77	73	32.1007, -81.1320	0.93
2nd High	73	72	66	70	32.1034, -81.1314	0.76
3rd High	73	65	67	68	32.1044, -81.1195	0.51
4th High	66	70	65	**67**	32.1042, -81.1325	0.87

Table A-3. Ranked modeled SO_2 concentrations at the location of maximum concentration for 2011-2013 with surface characteristics from the International Paper facility site.

Rank	2011 (ppb)	2012 (ppb)	2013 (ppb)	3-year Average (ppb)	Receptor (lat,log)	Distance from IP Savannah Mill (Km)
1st High	104	139	62	101	32.0925, -81.1335	1.55
2nd High	68	82	84	78	32.0943, -81.1378	1.67
3rd High	66	62	74	67	32.0844, -81.1229	2.26
4th High	65	61	73	**66**	32.0862, -81.1229	1.97

Appendix B
SO_2 Emissions Comparisons

Emission inventory and modeling work for this project began before the annual 2014 emissions were available. Therefore, the facility used 2011 -2013 emissions and meteorology since they were the most recently available when this project began. This Appendix will compare the 201 1-2013 SO_2 emissions to those in 2014 -2015 and to the current PTE. Also, additional clarifications will be made to better understand the modeling results.

Annual Shutdown Periods

There are zero SO_2 emissions modeled on the following dates: 02/14/11 -02/24/11, 02/14/12-03/06/12, and 02/12/13-02/27/13. IP-Savannah confirmed that the mill was not operating during these periods and that the mill has a shutdown period every year from mid-February to late February/early March.

Comparison of Modeled SO_2 Emissions to the GA EIS and EPA NEI

The hourly SO_2 emissions in 2011, 2012, and 2013 that were modeled were summed together to give annual total SO_2 emissions. The annual total SO_2 emissions that were modeled were slightly lower than the annual total SO_2 emissions contained in the Georgia Emissions Inventory System (EIS). It should be noted that the SO_2 emissions contained in the EPA National Emissions Inventory (NEI) are not correct for 2011 and 2012. IP-Savannah submitted updates for these years after the edit window for NEI updates had closed. See comparison in Table B-1.

Table B-1. Comparison of Modeled SO_2 Emissions to GA EIS and EPA NEI in 2011-2013.

Year	Modeled SO_2 (TPY)	GA EIS SO_2 (TPY)	EPA NEI SO_2 (TPY)
2011	7,053	7,907	4,233*
2012	6,267	7,680	3,622*
2013	6,653	8,071	8,071

*The 2011 and 2012 EPA NEI SO_2 emissions are incorrect and have not been updated since the NEI edit window was closed prior to identification of the errors.

IP-Savannah used the best available data when calculating their 2011-2013 air emissions for submittal to the EIS. This data consisted of emission factors derived from stack tests, as well as NCASI data.During 2014, CEMs were placed on several of the emission sources at the Mill. This data was used to calculate new emission factors, mainly the NCG factors for Power Boiler 13. The NCG emission factors for the EIS were based on stack tests performed in early 2013, and are as follows; LVHC emission factor = 7.23 lb SO_2/ADTUBP, HVLC emission factor = 0.6 lb SO_2/ADTUBP, and SOG emission factor = 3.7 lb SO_2/ADTUBP. The modeled NCG emission factors were based on CEMs data collected in 2014 when all gases were being burned in the Power Boiler and during times of maximum pulping, and are as follows; LVHC emission factor = 5.66 lb SO_2/ADTUBP, HVLC emission factor = 1.22 lb SO_2/ADTUBP, and SOG emission factor = 1.83 lb SO_2/ADTUBP. The LVHC and SOG emission factors were decreased from the EIS emission factors and the HVLC emission factor was increased from the EIS emission factor. IP-Savannah feels the NCG emissions factors based on CEMs data are more representative of actual Mill operations during the 2011-2013 time frame.

The emission factor for coal in Power Boiler 13 was also updated based on newer data. The EIS emission factor of 1.09 lb SO_2/MMBtu was derived from stack tests in early 2013. The modeled emission factor of 0.997 lb SO_2/MMBtu was derived using daily 2012-2013 coal sulfur data, and IP-Savannah feels it is more representative of actual Mill operations during the 2011-2013 time frame.

As a result of this new emission factor information, the "Modeled SO_2" emissions in Table B-1 for 2011, 2012, and 2013 are considered to be the most accurate emissions for those years. The Mill will use these updated NCG and coal emission factors for future EIS calculations.

Comparison of 2011-2013 vs. 2014-2015 SO_2 Emissions

In early 2015, IP-Savannah changed from burning coal in the power boiler (PB13) to burning natural gas (resulting in ~40% decrease in total SO_2 emissions from IP-Savannah). Table B-2 is similar to Table B-1, but this table has added EIS and NEI SO_2 emissions for 2014 and 2015.

Table B-2. Comparison of Modeled SO_2 Emissions to GA EIS and EPA NEI in 2011-2015.

Year	Modeled SO_2 (TPY)	GA EIS SO_2 (TPY)	EPA NEI SO_2 (TPY)
2011	7,053	7,907	4,233*
2012	6,267	7,680	3,622*
2013	6,653	8,071	8,071
2014	Not modeled	8,123	8,123
2015	Not modeled	5,862	Not submitted yet

*The 2011 and 2012 EPA NEI SO2 emissions are incorrect and have not been updated since the edit window has been closed.

As can be seen in Table B-2, the GA EIS SO_2 emissions for 2015 (part of the year burning coal and the remaining part of the year burning natural gas) are well below the modeled SO_2 emissions for 2011-2013. Previous to the coal to natural gas conversion, PB13 had a Regional Haze permit limit of 6,578 tpy and the facility-wide PTE including this Regional Haze permit limit was 11,178 tpy. After the coal to natural gas conversion, the PTE of PB13 was lowered to 514 tpy (based on max bark, coal, and balance natural gas) resulting in a facility-wide PTE of 5,114 tpy. The current PTE for this facility is below the modeled SO_2 emissions for 2011-2013.

Conclusion

Based on the analysis presented in this Appendix, it can be concluded that modeling 2011-2013 is clearly a conservative estimate of the current SO_2 impacts from IP-Savannah and can be used for designation recommendations.